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OF THE

BROOKLYN ENTOMOLOGICAL SOCIETY

Vol. XXXVI 1941

1872

EDITED BY
J. R. de la TORRE-BUENO

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Resolutions on the Death of

CHARLES W. LENG

Honorary President of the Brooklyn Entomological Society, Presented and Unanimously Passed at the Meeting of the Society on February 13, 1941.

Whereas: We, the members of the Brooklyn Entomological Society have learned with sorrow of the passing of Charles William Leng, one of the Incorporators of the Society in 1885, and its Honorary President since December 14, 1922, who died at his home on Staten Island, on January 24, 1941, in the eighty-second year of his age; and

Whereas: We recognize his great services to entomology, particularly as the author of the monumental "Catalogue of the Coleoptera of America, North of Mexico," published in 1920; and

Furthermore: We desire to record our appreciation of his genial character, his wide learning and his ever-willing help to fellow-students;

Therefore, be it Resolved: That this resolution be unanimously voted as a tribute to his memory; and that it be entered upon the Minutes of the Society and published in its Bulletin.

SYNOPTIC TABLE OF NORTH AMERICAN SPECIES OF DIADASIA (HYMENOPTERA, APOIDEA).

By P. H. Timberlake, Riverside, Calif.

In the following key to the males and females of *Diadasia* nearly all the described species found in North America, north of Mexico, are included. The few omissions are noted at the end of the key.

Key to Diadasia.

Males.

1. Clypeus black; mesonotum shining, more or less punctured 2
   Clypeus and spot at base of mandible pale yellow or creamy white; mesonotum dull, obscurely punctured. *ochracea* (Ckll.)
2. Hair of head and thorax entirely pale 3
   Hair of head, pleura, propodeum, legs and abdomen mostly black; hind tibiae with a thorn-like tooth on under side at apex .... *nigrifrons* (Cress.)
3. Tibial spurs strongly curved at apex; hind basitarsi greatly produced at apex beneath, the process either comma-shaped or evenly rounded at apex 4
   Tibial spurs only slightly curved, or briefly hooked at apex; hind basitarsi without a large process at apex 7
4. Process of hind basitarsi dilated and rounded at apex, reaching about middle of following joint 5
   Process of hind basitarsi curved, dilated at base, more or less comma-shaped 6
5. Process almost evenly rounded at apex; hair of abdomen abundant, rather long, erect and ochraceous, with a narrow apical band of depressed, more whitish hair on tergites 2 to 5; base of tergites 2 to 6 may have inconspicuous black hair; length, 12–15 mm. .... *opuntiae* Ckll.
   Process a little less dilated, outer margin nearly straight, apex oblique (longer on outer side); hair of abdomen thinner and shorter, subdepressed, forming a moderately narrow, even, white apical band on tergites 1 to 6, broader and less defined on 6, the disk of 3 to 5 and base of 6 with black hair; hair of tergite 2 whitish except a narrow band of black intervening before apical band, which is subdilated medially; length, about 11 mm. .... *piercei* Ckll.
6. Process of hind basitarsi reaching apex of following joint, or a little beyond; 3rd antennal joint equaling 4 + 5, 5 dis-

tinctly shorter than 6, somewhat longer than 4; apical appendage of stipites moderately expanded subapically.
australis (Cress.)
(Including *australis californica* Timb.)

Process of hind basitarsi broader across the base, not quite reaching apex of following joint, less comma-shaped; 3rd antennal joint somewhat shorter than 4 + 5, 5 equaling 6, nearly twice as long as four; apical appendage of stipites with a much broader, more concave expansion subapically.
rinconis Ckll.
(Including *rinconis petrina* Ckll. and
rinconis mimetica Ckll.)

7. Abdomen with pubescence entirely pale 8

Abdomen with more or less fuscous or black hair, especially at base of tergites of the last five segments 13

8. Hair of abdomen much depressed, except on the first two tergites 9

Hair of abdomen suberect, moderately long 12

9. Frons depressed in front of ocelli 10

Frons with a large rounded polished boss on each side of median line in front of ocelli . . . . . . *tuberculifrons* Timb.

10. Smaller species; teeth of 7th tergite spine-like, well separated; 6th ventrite with a large tuft of white hair on each side near base 11

Larger, about 8.5–11 mm. long; apical teeth of 7th tergite broad and blunt, with a narrow notch between.
laticauda Ckll.

11. Basal area of propodeum polished and shining.
sphaeralcearum Ckll.

Basal area of propodeum tessellate and dullish.
sphaeralcearum affinis Timb.

12. Larger, about 11–13 mm. long; head as long as wide; middle joints of flagellum longer than wide, the first two shorter, about equal; 6th ventrite with short, moderately dense, erect pale pile except toward base . . . . . *enavata* (Cress.)

Smaller, about 8 mm.; head wider than long, vertex broad; middle joints of flagellum as long as wide, the first joint distinctly longer than second; 6th ventrite with short brown, or blackish, hair on each side near base, and a band of paler pile at apex . . . . *diminuta* (Cress.)

13. Head no wider than long, inner orbits parallel 14

Head more or less distinctly wider than long, the vertex broad, inner orbits converging below 15

14. Smaller, about 9 mm. long; head somewhat longer than wide; abdomen with subdepressed hair, black on disk of tergites 2–7; white apical band on tergites 2–6 moderately wide; hind basitarsi not noticeably flattened beneath nor sharp-edged anteriorly .... *angusticeps* Timb.

Larger, about 12–13 mm. long; hind basitarsi much flattened beneath, subdilated before the apex, sharply edged on anterior margin; abdomen with thin black hair, except on first two tergites, the white apical band on tergites 2–5 or 2–6 narrow; tergite 7 bilobate at apex. *bituberculata* (Cress.)

15. Basal area of propodeum shining, more or less polished ... 16

Basal area of propodeum minutely tessellate, dull; hair of tergites long, erect, the black hair at base of segments shorter, often not very apparent .... *nitidifrons* Ckll.

16. Apex of 6th ventrite with conspicuous dense erect pile, the disk comparatively nude at least on basal half 17

Ventrite 6 with comparatively short inconspicuous pile at apex and a dense brush of hair on each side toward base, or the entire disk with short, thin inconspicuous pile 18

17. Larger, about 9–10 mm. long; apical half of 6th ventrite with dense brush of fuscous hair; apical appendage of stipites ovally expanded before the acute apex; vernal species. *martialis* Timb.

About 7–8 mm. long; apex of 6th ventrite with a tuft of dense pile, more or less divided in median line, the greater part of disk nude (normally only the apex of 6th ventrite exposed by a broad median emargination at apex of ventrite 5); apical appendage of stipites dilated at base, slender and very acuminate beyond .... *consociata* Timb.

18. Ventrite 6 with a dense hair-brush on each side toward base; the apical middle with shorter pile 19

Ventrite 6 with thin short pile all over, a brush of longer hair at each side either vaguely indicated or absent 22

19. Larger; about 9–10 mm. long; hair-brushes at base of 6th ventrite pale and large, extending to middle but not quite joining, the apex with short dense pile, the middle of disk nude and polished; inferior apical appendage of stipites moderately wide, acute at apex, with a depression on under margin from base to beyond the middle of inferior appendage .... *palmarum* Timb.

About 7–8 mm. long; hair-brush on each side of base of 6th ventrite small, black, the surface of disk otherwise shining, thinly pilose, the pile becoming denser and longer at apex; inferior apical appendage of stipites rather narrow at base, tapering and acuminate toward apex; superior apical appendage short, oval 20

20. Apical teeth of tergite 7 usually slender 21

Apical teeth rather short and broad at base, blunt at apex; inferior apical appendage of stipites sharply acuminate at apex, nearly straight on inner margin, broadly rounded on basal half of outer margin, where it is subdilated; superior apical appendage a little less than one-third as long as inferior appendage, and with a circular foveate depression on inner margin at base . . . . . *lutzi lutzi* Ckll.

21. Inferior apical appendage of stipites less sharply acuminate than in *lutzi;* curvature of outer margin forming a shorter arc confined to base; superior apical appendage much smaller, about one-fifth to one-fourth as long as inferior appendage . . . . *lutzi difficilis* Timb.

Inferior apical appendage feebly dilated at base, narrow, slightly tapering, but hardly acuminate; superior apical appendage still smaller, between one-fifth and one-sixth as long as inferior appendage . . . . . . *lutzi deserticola* Timb.

22. Larger species, 8–10 mm. long, pubescence of abdomen erect, the pale apical bands narrow 23

Smaller, about 6.5–7 mm. long; pubescence of abdomen rather short, depressed and ochraceous, but black on disk of tergites 3 to 6; apical band on these segments broad, even, sharply defined; disk of ventrite 6 with uniformly short erect pile; superior apical appendage of stipites short and broad, not surpassing apex of incurved spur at apex of stipites; inferior apical appendage long and narrow. *afflictula* Ckll.

23. Hair of abdomen subuniformly long, pale ochraceous, but mainly black on tergites 3 to 7; apical band on tergites 2 to 5 narrow, white, the integument beneath bands whitish hyaline; pile of ventrite 6 uniformly short; inferior apical appendage of stipites long and slender, the superior appendage similar, about seven-eighths as long. *afflicta* (Cress.)

Hair of abdomen long, but becoming shorter toward base and at apex of tergites 2 to 6, whitish or pale ochraceous, becoming black on 7 and on more than the basal half of 3 to 6; as seen from in front the apical bands appear very narrow and somewhat fringe-like, but viewed from side they appear broad; pile of ventrite 6 short, becoming somewhat longer but not denser in a feebly defined brush on each side at base; inferior apical appendage of stipites long, moderately narrow, and acuminate; superior appendage short and broad, not surpassing the incurved spur at apex of stipes . . . . *vallicola* Timb.

Females.

1. Mesonotum shining, more or less punctured 2
   Mesonotum opaque, impunctate; front femora with long, dense hair beneath, forming a dense beveled brush toward base . . . . *ochracea* (Ckll.)
2. Front femora without a long acute process at base beneath 3
   Front femora with a long acute process at base beneath; hair of head, pleura, legs and abdomen, except first one or two tergites, black . . . . *nigrifrons* (Cress.)
3. Spurs of middle and hind tibiae strongly curved at apex . . 4
   Spurs nearly straight or slightly hooked at apex 8
4. Basal area of propodeum smaller, microscopically tessellate and more or less dull, or opaque 5
   Basal area more delicately tessellate and moderately shiny; lateral margins of basal area nearly straight except near end where they curve downward and meet just below center of segment; pubescence fulvo-ochraceous, paler beneath; abdominal bands broad, widened in middle on tergites 2 to 4; length usually about 13 mm.
   opuntiae Ckll.
5. Basal area less opaque, its lateral margins less arcuate; sides of vertex feebly tessellate; third antennal joint about two and one-half times as long as thick at apex 6
   Basal area opaque; its lateral margins more arcuate; sides of vertex polished; third antennal joint about twice as long as thick at apex 7
6. Pubescence of tergites entirely pale, subappressed, becoming denser and band-like at apex of 2 to 5, that at apex of 5 fulvo-ferruginous . . . . *australis* (Cress.)
   Pubescence at base of tergites 2 to 4 brown or black; apical margin of tergites 2 to 6 with ochraceous band moderately broad, widened in the middle; hair at apex of tergite 5 more or less fulvo-ferruginous, or tinged with brown.
   australis californica Timb.
7. Pubescence usually pale ochraceous or cinereous; apical band

on tergites 2 to 4 rather broad, narrowed on each side in front by a broad emargination, that on 2 extended forward to base on lateral margins .... *rinconis* Ckll.

Pubescence more or less fulvo-ochraceous; apical band on tergites 2 to 4 narrow, even, a little widened medially on 4, that on 2 not extended forward at the sides; disk of tergites 2 to 4 and basal half of 5 with black hair. *rinconis mimetica* Ckll.

8. Scopa of hind legs generally whitish or ochraceous; if scopa is brownish or fuscous, the hair on outer side of front and middle tibiae obviously light in color; head more or less broader than long, with orbits diverging above, and basal area of propodeum shining 9

Scopa of hind legs black and hair of front and middle tibiae and tarsi very dark; head somewhat broader than long, the inner orbits parallel; basal area tessellate and dull; hair of abdomen beyond second segment black, with a narrow white apical band on tergites 2 to 4; mesonotum with rather dense pale brown or ochraceous hair. *bituberculata* (Cress.)

9. Head wider than long, inner orbits more or less divergent above 10

Head a little longer than wide, inner orbits parallel; hair on disk of tergites 2 to 4 and on base of 5 more or less blackish or intermixed with black; apex of tergites 1 to 4 with a moderately wide white band; sides of tergite 6 and apex of 5 with reddish or chocolate colored hair; basal area polished; length, about 8–10 mm. *angusticeps* Timb.

10. Large species, 12–15 mm. long; head but little wider than long, inner orbits feebly divergent above; hair of mesoscutum dense on anterior third and lateral margins, but a large quadrate area nude or very thinly hairy 11

Smaller, about 7–11 mm.; mesoscutum often bare on posterior part, but the nude area generally due to wear and more or less irregular in shape 12

11. Pubescence fulvo-ochraceous, paler beneath and on abdomen; hair of abdomen depressed, except at base of tergite 1, denser and forming a narrow band at apex of tergites 2 to 4; apex of tergite 5 with a broad dense fulvo-ochraceous band; scopa unusually broad and dense, finely plumose; basal area dull; length, about 12–13 mm. *enavata* (Cress.)

Pubescence pale ochraceous, white beneath and on abdomen; hair on basal part of tergites much longer and less depressed than in *enavata;* apical bands narrow, the tegument beneath bands whitish hyaline; hair on tergite 5 rather dense and pale ochraceous (that on apical margin worn away in type and probably ferruginous); scopa less ample, less dense than in *enavata,* pale ochraceous, becoming dusky on lower half of the basitarsal portion; apical joint of tarsi conspicuously darker than preceding joints; length of type, about 13.5 mm.; anterior wing, 10.8 mm.; width of abdomen, 5.5 mm. .... *megamorpha* Ckll.

12. Hair of abdomen entirely pale, or with only a trace of black hair at base of segments 13

Considerable black hair at base of tergites 2 to 5, or 3 to 5 20

13. Pubescence of abdomen uniformly dense over entire surface of tergites 14

Pubescence of abdomen less dense, the apex of tergites 1 to 4 or 2 to 4 more or less fasciate 16

14. Frons without bosses in front of ocelli; smaller more slender species, 6–8 mm. long 15

Frons with two polished rounded bosses just in front of ocelli; basal area of propodeum polished; length, 7–8 mm. *tuberculifrons* Timb.

15. Basal area polished .... *sphaeralcearum* Ckll.

Basal area tessellate and rather dull. *sphaeralcearum affinis* Timb.

16. Basal area polished; mesopleura polished and finely punctured 17

Basal area dull; mesopleura slightly dullish, and closely, moderately coarsely punctured; first two tergites with thin erect hair, the following segments successively more hairy, the hair depressed, rather coarse, but apex of tergites 2 to 4 with a narrow band of denser finer hair; hair at apex of tergites 5 and on sides of 6, ferruginous; length, about 9–11 mm. .... *laticauda* Ckll.

17. Hair on disk of tergites before the apical band, rather dense, partially concealing the surface; scopa of hind legs ochraceous or whitish 18

Hair on disk of tergites thin, more or less exposing the surface; scopa more or less fuscous or brownish fuscous, at least on the dorsal margin 19

18. Apical bands of abdomen narrow, white, sharply defined on

tergites 1 to 4; hair preceding the bands depressed, rather dense and coarse, with a few short erect white hairs interspersed; hair at apex of abdomen ferruginous brown or somewhat fuscous; scopa of hind legs ochraceous or whitish; length, 8–9 mm. . . . . . *diminuta* (Cress.)

Hair of abdomen more ochraceous, less depressed, the apical bands much broader, not sharply defined, the erect hair more or less infuscated; hair at apex of abdomen more or less fulvous; apical margin of tergites beneath the bands not definitely whitish hyaline; length, 8–9 mm. *vallicola* Timb.

19. Hair of abdomen white, the bands moderately narrow, not sharply defined; hair at apex of abdomen and on venter and scopa brownish fuscous; apical margin of tergites whitish hyaline beneath the bands; clypeus with rather coarse, moderately sparse round punctures; length, 8 mm. . . . . *lutzi lutzi* Ckll.

Hair of abdomen pale ochraceous; bands a little broader and less defined, the hair becoming gradually thinner toward base of segments; erect hairs interspersed on tergites blackish, and some of the depressed hair at extreme base of the tergites sometimes black; scopa more less brownish fuscous on dorsal margin and pale ochraceous below; punctures of clypeus closer and more or less sulcate; length, 7–8 mm. . . . . *lutzi deserticola* Timb.

20. Tergites 3 to 5 with more or less black hair at base; hair of tergite 2 entirely or predominantly light, sometimes slightly infuscated across the middle of disk, or at base 21

Tergites 2 to 5 with much black hair on basal part of disk 23

21. Smaller species, 8–10 mm. long; hair of tergite 5 mainly light 22

Larger, 10–11 mm. long; hair of tergite 5 mainly black, but whitish at sides subapically, or with light hairs intermixed subapically across the middle; apical band on tergites 2 to 4 white, dense, sharply defined, narrow at sides and broadened in middle; scopa brownish black, rather loose; clypeus with moderately close coarse punctures. *afflicta* (Cress.)

22. Clypeus with moderately coarse, more or less sulcate punctures; hair of abdomen white, with rather inconspicuous black hair at base of tergites 3 to 5, or sometimes 2 to 5; hair at apex of tergite 5 and on sides of 6 dark brown

or blackish; apical band on tergites 1 to 4 rather broad, not sharply defined; scopa of hind legs more or less brownish fuscous; length, about 8 mm. *lutzi difficilis* Timb.

Clypeus with rather fine close punctures; head less transverse, abdomen broader; basal half of tergites 3 to 5 with black hair, or with thin pale hair more or less intermixed with black; apical band on 1 to 4 broad, even, moderately sharply defined, whitish; hair at apex chocolate brown, preceded on 5 by a white band; scopa pale ochraceous, more or less brown on basitarsi; length, 9–10 mm. *palmarum* Timb.

23. Basal area of propodeum shining 24

Basal area of propodeum dull; clypeus coarsely punctured, sometimes with a few fine punctures interspersed; hair of abdomen rather long, but depressed, the apical bands broad, the black basal bands sometimes hidden when segments are retracted; pubescence of mesonotum and light bands of abdomen fulvo-ochraceous; length, about 8–9 mm. .... *nitidifrons* Ckll.

24. Similar to *nitidifrons,* but mesoscutum moderately closely and uniformly punctured; the hair shorter on posterior part of disk but not much thinner; hair bands of abdomen whitish, covering less than half of each segment at middle, slightly narrowed sublaterally on tergites 3 and 4; hair of abdomen slightly shorter; hair at apex of abdomen and on inner side of tarsi generally blacker; length, 8–9 mm. .... *martialis* Timb.

Smaller, about 7–8 mm. long; hair of head and thorax shorter, more depressed on mesonotum, more ochraceous, whitish beneath on thorax, cheeks and face; hair bands of abdomen more sharply defined, the black bands at base of segments generally apparent on tergites 2 to 5, unless abdomen is much contracted; clypeus dullish, finely, more or less obscurely punctured, with a few large punctures interspersed; basal area polished, or very slightly dullish .... *consociata* Timb.

Diadasia vallicola Timb.

The female was known but had not been associated with the male type when this species was described. In 1939, after the description had been submitted for publication, the following material of *vallicola* was collected: 1 male, 2 females, on *Sphaeralcea ambigua,* 3½ miles southwest of Victorville, California, May 4 (Timberlake & W. P. Cockerell); 7 males, 5 females, on *Aster abatus,* 3 miles southwest of Victorville, May 12 (Timberlake); and 3 females, on *Sphaeralcea ambigua,* Morongo Valley, San Bernardino County, May 7 (Timberlake & W. P. Cockerell). One female had previously been taken near Victorville, on *Aster abatus,* May 17, 1930; and two females at Kramer Junction, May 1, 1936 (C. M. Dammers). The characters given for the female in the above table should be sufficient for its recognition.

Diadasia blaisdelli Ckll.

The type of this species, a female from Poway, San Diego County, California, has been examined. It is not much different from females of *D. ochracea* Ckll. from southern California and I doubt if it is really distinct. It seems to be only an exceptionally brightly colored specimen of *ochracea,* but I have not had typical New Mexico material for comparison.

Diadasia friesei Ckll.

This I have not seen. It was described from the female, which probably would run to *D. opuntiae* in the table. According to the description, it differs from *opuntiae* in the size (11 mm.), pale ochraceous pubescence, and narrow hair-bands of abdomen, ill-defined anteriorly. It was based on a Morrison specimen, ostensibly from southern California, but it has never been recognized from that region, and probably actually came from northern Mexico.

Diadasia piercei Ckll.

D. piercei was described in both sexes from Corpus Christi and Beeville, Texas. Dr. Cockerell kindly loaned me a male in his collection, which has been included in the above table. The female probably runs, like *friesei,* near *D. opuntiae* in the table. It differs from *opuntiae* and *friesei* in having the dense hair at apex of abdomen chocolate colored.

NEW OR INSUFFICIENTLY-KNOWN CRANE-FLIES FROM THE NEARCTIC REGION (TIPULIDAE, DIPTERA). PART VII.[1]

By Charles P. Alexander, Amherst, Mass.

The preceding part under this title was published in 1940 (Bull. Brooklyn Ent. Soc. 35: 84–89). The novelties discussed herewith are from North Carolina and Tennessee, where a part of the material was taken by myself while engaged in a collecting survey of the southern Appalachians. Additional material was included in extensive lots of Tipulidae submitted for opinion by Dr. J. Speed Rogers, now in the Rogers Collection, Gainesville, Florida. Still further specimens were taken by my former student, Dr. Inez W. Williams, to whom I am greatly indebted for much material taken in the Great Smoky Mountains in eastern Tennessee and elsewhere in the vicinity of Knoxville. The detailed report on the Smoky Mountains Tipulidae will be published in a separate paper.

Antocha (Antocha) decurvata n. sp.

General coloration buffy, the praescutum with three conspicuous brown stripes, the central stripe broader and darker in color; head light gray; legs brownish black, the femoral bases yellow; wings with a grayish tinge, the prearcular field milky white; veins brown; abdomen pale brown, the subterminal segments brownish black; male hypopygium with the outer dististyle produced into a long, pointed, blackened apex; aedeagus simple arising dorsally from a transverse sclerotized phallosomic plate, the distal half decurved; outer gonapophyses broadly obtuse at tips, inner pair slender, their apices more narrowly rounded.

Male.—Length about 7–7.5 mm.; wing 7–7.5 mm.

Rostrum and palpi black. Antennae short, black; flagellar segments oval, the ventral face of the more basal flagellar segments a little produced. Head light gray.

Pronotum darkened medially, paling to buffy on sides. Mesonotal praescutum buffy with three conspicuous stripes, the central one broader and darker than the laterals, vaguely divided medially by a still darker capillary vitta; posterior sclerites of notum pale, the scutal lobes weakly darkened. Pleura buffy, variegated with brownish gray on anepisternum and ventral pleurotergite. Halteres pale, knob weakly darkened.

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[1] Contribution from the Entomological Laboratory, Massachusetts State College.

Legs with the coxae and trochanters yellow; remainder of legs brownish black, the femoral bases yellow. Wings with a grayish tinge, milky white in prearcular field; stigma only faintly or not at all darkened; veins brown, abruptly pale at base. Venation: R_2 fainter than remaining veins; *m–cu* before fork of *M*.

Abdomen pale brown, the subterminal segments brownish black; hypopygium brown. Male hypopygium with the dististyles relatively short and stout, the outer style with the blackened apex long and pointed, including nearly one-half the total length of style. Aedeagus simple, arising dorsally from the base of a transverse sclerotized phallosomic plate, the distal half slightly decurved. Outer pair of gonapophyses broadly obtuse at tips, the inner or more posterior pair more slender but with the tips rounded or broadly subacute.

Habitat: Tennessee.

Holotype: ♂, Mascot, near Knoxville, March 12, 1938 (*Williams*). *Paratypes,* 1 ♂, Love Brook, near Knoxville, March 12, 1938 (*Williams*); 1 ♂, Lyon's View, near Knoxville, March 12, 1938 (*J. W. Jones*).

Among the described Nearctic species, the present fly is closest to *Antocha* (*Antocha*) *saxicola* Osten Sacken, the dististyles being much the same in both flies. The latter species has the inner dististyle more narrowed at apex, the aedeagus subtended on either side by a wide flange, and the conformation of the apices of both gonapophyses different. Both flies have a sclerotized phallosomic plate such as described above but in *decurvata* this is shorter transversely and with the ends reflexed.

Antocha (Antocha) capitella n. sp.

This is the species earlier discussed by Rogers (Occas. Pap. Mus. Zool. Univ. Michigan, 215: 24–25; 1930) in his report on the Tipulidae of the Cumberland Plateau, Tennessee. The fly was left unnamed at that time pending further study of the difficult genus *Antocha*. The species is closest to *opalizans* Osten Sacken, having the same general type of male hypopygium, with both sets of gonapophyses developed into acutely pointed spinous points subtending the aedeagus.

Outer dististyle about as in *opalizans,* with the blackened apex of moderate length, longer than in *biarmata* Alexander but shorter than in either *obtusa* Alexander or *saxicola* Osten Sacken. Inner pair of gonapophyses strongly incurved at tips.

Aedeagus much shorter than either pair of gonapophyses, the apex appearing as a short cap. In reality, this apical cap is sclerotized, passing into hyaline membrane which is not or scarcely visible in microscopic slide mounts. In *opalizans,* the inner gonapophyses lie parallel to one another, their tips not or scarcely converging; entire outer end of aedeagus beyond the gonapophyses uniformly sclerotized, with no appearance of a capitate structure, as described.

Habitat: Tennessee.

Holotype: ♂, Allardt, Fentress County, July 1924 (*J. S. Rogers*); in Rogers Collection. *Allotopotype,* ♀. *Paratopotypes,* ♂♂♀♀, June 6–July 22, 1924. In my collection I have two slides representing paratype males, dated July 19 and 22, 1924; remainder of type-series in Rogers Collection.

Dicranota (Eudicranota) yonahlossee n. sp.

Allied to *catawbiensis;* general coloration yellow; legs yellow, the tips of the femora and tibiae narrowly and subequally blackened; wings pale yellow, the costal and stigmal regions slightly more saturated yellow; cells R_3 and M_1 petiolate; male hypopygium black, the median tergal lobe narrow, its subtending arms slender; dististyle terminating in a group of about a dozen black peglike spines.

Male.—Length about 6 mm.; wing 7 mm.

Rostrum and palpi yellow. Antennae short; scape and pedicel yellow; flagellum with basal segments brown, the outer segments passing into black. Head pale yellow.

Thorax uniformly yellow. Halteres pale, the knobs weakly darkened. Legs with the coxae and trochanters pale yellow; femora obscure yellow, the tips narrowly but conspicuously blackened; tibiae pale yellow, the tips conspicuously blackened, in amount about equal to the femoral tips; basitarsi obscure yellow to brownish yellow, the tips and remainder of tarsi brownish black. Wings with a pale yellow tinge, the costal and prearcular regions, with the stigma, a trifle more saturated yellow; veins brown, brighter at wing-base. Venation: *Rs* square and short-spurred at origin; cell R_3 petiolate, R_{2+3+4} being subequal in length to *r–m;* cell M_1 with petiole longer than *m.*

Abdomen obscure yellow, narrowly darkened laterally, the ninth segment and genitalia black. Male hypopygium large, constructed as in the subgenus; most similar to that of *catawbiensis,* differing as follows: Median lobe of tergite much narrower, with shallow apical notch; lateral tergal arms longer and more slender, the setiferous areas at base more extensive and paler. Interbase with the apical fascicle of bristles very broad and flattened. Basistyle with the outer lobe very broad and flattened, its armature of spines sparse. Dististyle narrow, split on its basal two-thirds, the apex with about a dozen short black peglike spines; at base of dististyle, on lateral portion, a group of from two to four blackened spinous setae.

Habitat: North Carolina.

Holotype: ♂, Linville Falls, Burke County, altitude 3200 feet, June 21, 1939 (*Alexander*). *Allotopotype:* ♀, June 3, 1940. *Paratopotype:* 30 ♂♂♀♀, with the allotype (*Alexander*).

Dicranota (*Eudicranota*) *yonahlossee* is most readily told from *D.* (*E.*) *catawbiensis* Alexander by the structure of the male hypopygium. The blackened tips of the femora and tibiae are somewhat narrower and more distinct in the present fly. The type locality, Linville Falls, is a deep granitic gorge with wonderful stands of the Canadian Hemlock, *Tsuga canadensis* (L.) Carr. This interesting locality is similarly the type-locality of the Yonahlossee Salamander, *Plethedon yonahlossee* Dunn.

Limnophila globulifera n. sp.

Allied to *niveitarsis;* general coloration black, sparsely pruinose; antennae of male elongate; posterior tarsi white; wings with a weak brown tinge, the prearcular and costal regions more yellowish; R_{2+3+4} a little longer than *m–cu;* male hypopygium with groups of modified setae on basistyle and inner dististyle; mesal face of basistyle densely covered with pale flask-shaped structures to present a tesselated appearance.

Male.—Length about 7 mm.; wing 7.5 mm.; antenna about 4.5 mm.

Rostrum and palpi black. Antennae black, elongate in male, being nearly equal to two-thirds the entire body; first flagellar segment cylindrical, succeeding segments subcylindrical, with the lower face a little bulging; verticils much shorter than the segments. Head with the anterior vertex and orbits light gray, the posterior vertex and occiput dark gray; anterior vertex broad.

Thorax dark gray, the surface of praescutum and scutal lobes only thinly dusted, subnitidous. Pleura dusted with gray. Halteres pale yellow. Legs with the coxae and trochanters yellow; femora yellow, the tips broadly black, including about the distal two-thirds of fore legs, much narrower on the middle and hind femora, especially the latter; tibiae brown, the tips narrowly more blackened; fore and middle basitarsi brownish black, the tips and remainder of these tarsi black; posterior tarsi with basal three segments white, with snowy-white vestiture; terminal two segments black; proximal third of posterior basitarsi a little enlarged and with longer and more conspicuous white setae. Wings with a weak brown tinge, the prearcular and costal fields more yellow; stigma long-oval, brown; veins brown, more yellow in the brightened fields. Venation: Sc_1 ending about opposite fork of Rs, Sc_2 a short distance from its tip; Rs angulated at origin; R_{2+3+4} of moderate length, about one-fifth longer than *m–cu;* R_{2+3} arcuated along the lower edge of stigma; R_2 very faintly indicated to subatrophied; cell R_3 wide at margin; cell M_1 subequal to or a little longer than its petiole; *m–cu* beyond midlength of cell *1st* M_2, at from three-fifths to three-fourths the length of the cell. Abdominal tergites black, sternites obscure yellow, the basal segments a little darker; outer segments, including hypopygium, more uniformly blackened. Male hypopygium with the basistyle near outer end provided with two separate groups of modified setae, the largest group with about ten setae, the second group lying a little more distad, with about five or six; in normal slide mounts, the major group lies closer to the mesal edge of the style than does the smaller one. Outer dististyle yellow, the bispinous apex blackened. Inner dististyle with a conspicuous group of about a dozen short black spinous setae on lateral edge; apex a little produced, at its base with two long modified setae. Gonapophyses with apical blade weakly expanded, the margin microscopically serrulate. Aedeagus with apex shallowly trifid. Mesal portion of basistyle adjoining the aedeagus pale, densely set with small flask-shaped structures to give a tesselated or reticulated appearance to this region; under higher magnification, each of these structures is seen to be shaped much like an ordinary electric light bulb. In *niveitarsis,* the inner dististyle has the spinous setae much less evident and poorly grouped. Basistyle with the groups of modified setae much reduced in their numbers, totalling only four or five. Gonapophyses with the blades broader and more flattened, at apex narrowed to an acute point. Aedeagus with the three apical prongs longer. Mesal portions of basistyle provided with microscopic setulae and groups of the same but entirely without flask-shaped structures such as occur in the new species.

Habitat: North Carolina.

Holotype: ♂, Linville Falls, Burke County, altitude 3200 feet, June 21, 1939 (*Alexander*). Taken with the species last described in a small accessory ravine immediately at foot of the main falls. *Paratype:* 1 ♂, Mount Mitchell, Yancey County, altitude 6306 feet, June 8, 1940 (*Alexander*).

Limnophila globulifera is allied to *L. cherokeensis* Alexander and *L. niveitarsis* Osten Sacken, especially to the latter. It differs most conspicuously in the structure of the male hypopygium, as described.

BOOK NOTES.

French-English Science Dictionary for Students in Agricultural, Biological, and Physical Sciences, by Louis De Vries. McGraw-Hill Book Co., New York, N. Y. 1940. $3.00.

Dr. De Vries now gives us the necessary companion to his German-English Science Dictionary. It has the same scope but appears to contain more non-technical words than the German. This fact probably enhances its usefulness by making it unnecessary to have at hand a general dictionary as well. This French-English Dictionary is conceived and carried out on the same plan as its predecessor. But we miss the names of many of the coadjutors in the previous one.

Dr. De Vries puts up a lightning-rod on the fly-leaf, in the form of this quotation; from Dr. Samuel Johnson: "Dictionaries are like watches; the worst is better than none, and the best cannot be expected to go quite true."

Of course, any specialist can go through the dictionary and note the missing terms in his field. The more abstruse and rare terms, or the neologisms of some obscure paper, will always be among the missing. We have some 100 or more that were omitted from our Glossary because no definition was available, and even specialists of standing in given fields knew them not. So, Dr. De Vries can hardly be held responsible if he failed to include some term or another.

Now, we wish there were an adequate Latin-English dictionary; and then, when the current turmoil dies down, we hopefully look forward to similar word-books for Italian, Portuguese, Bohemian, Hungarian, gradually working our way East to Chinese and Japanese.

The need and the usefulness of this dictionary cannot be overemphasized. J. R. T.-B.

DR. WILLIS STANLEY BLATCHLEY.

W. S. Blatchley at 146 Stuyvesant Place, Staten Island, N. Y. (Photo by Wm. T. Davis.)

It is a pleasure to those acquainted with the late Dr. W. S. Blatchley, who died on May 28, 1940, to note the esteem in which he is held, and the general recognition of the great practical usefulness of his publications to his fellow naturalists. The story of his life has lately been told in our entomological journals and elsewhere. He wrote on many subjects: geology, plants, insects, birds, fishes, and produced in several groups almost indispensable manuals for specific identifications. In almost all of these manuals he made pleasing references to the literary aspects of the subject, and when he wrote his five "Nature Books," he made real literary contributions to his beloved natural history.

Though referred to briefly in "Blatchleyana," 1930, it is not generally recognized that Dr. Blatchley often wrote under great physical difficulties, and it was, for instance, only his determination to finish a job once undertaken, that finally produced the manual on the "Hemiptera of Eastern North America."

In 1925, under date of July 23, he wrote: "I fear that I am going to lose use of the right side of my body, as my circulation therein appears to be gradually growing worse." In subsequent letters he often complains. In 1928 I sent him a group photograph of the Orthopterologists taken at the Ithaca meeting in August, to which he replied: "I enjoyed my trip to Ithaca very much, even if my neuritis did bother me a good deal. I enjoyed being with you and Mr. Leng, and renewing our old acquaintanceship. As you suggest, the main 'kick' which I got out of the meeting was the commendation of the many entomologists from the Agricultural Experiment Stations and Colleges regarding my books on insects. I have come to the conclusion that my time in preparing them was well spent, even if I am at a financial loss in publishing them."

On February 21, 1929, he wrote: "I cannot get rid of the neuritis in my back. It has been with me now for 10 months. The only time I am free from pain is for an hour or so after a meal or a hot bath, but one cannot eat and bathe all the time." On October 1, 1929, he wrote: "I thank you very much for your kindness in sending me the two views of 'yours truly' taken in the back yard of your domicile. They show me to be what I feel I am—an old codger. Still if it was not for this infernal neuritis in my fingers and toes on these frosty mornings, I would be pretty well."

Dr. Blatchley often stated that he was not going to publish any more books, but his urge to be busy was ever strong, and in 1939 we received an illustrated paper of 121 pages on: "The Fishes of Indiana." Dr. Blatchley's first three scientific papers were on certain of the fresh-water fishes of Indiana, and about his last publication also dealt with them. On the fly leaf of the 1938 pamphlet, he kindly wrote: "To my longtime friends and fellow naturalists, Chas. W. Leng and Wm. T. Davis."

WM. T. DAVIS.

SUPPLEMENTAL LIST OF COLEOPTERA FOUND LIVING IN AND ON VARIOUS FUNGI.

By Herman Moennich, Little Neck, N. Y.

This list is a continuation of my studies on the beetles living in and on various fungi. The season of 1939 was too dry for the growth of fungi in this locality. Of the many field trips, there was only one good day for collecting.

My thanks to Mr. F. R. Lewis of the New York Mycological Society for the identification of most of the fungi and to Mr. R. E. Blackwelder of the American Museum of Natural History for the identification of some of the Staphylinidae.

Polyporous sulfureus (Bull.) Fries.

Staphylinidae.

Philonthus umbrinus Grav., 23 specimens; 30.VII.1939, Suffern, N. Y.

Staphylinus tomentosus Grav., 1 specimen; 30.VII.1939, Suffern, N. Y.

Tachinus luridus Er., 27 specimens; 30.VII.1939, Suffern, N. Y.

Tachinus fimbriatus Grav., 1 specimen; 30.VII.1939, Suffern, N. Y.

Tachinus picipes Er., 1 specimen; 30.VII.1939, Suffern, N. Y.

Erotylidae.

Triplax thoracica Say, 1 specimen; 30.VII.1939, Suffern, N. Y.

Mordellidae.

Mordella scutellaris Fab., 1 specimen; 30.VII.1939, Suffern, N. Y.

Amanita rubescens Fries.

Staphylinidae.

Deinopsis americana Kr., 1 specimen; 31.VII.1938, Midvale, N. J.

Gyrophaena fasciata Say, 3 specimens; 31.VII.1938, Midvale, N. J.

Atheta virginica Bnhr., 1 specimen; 31.VII.1938, Midvale, N. J.

Nitidulidae.

Pallodes silaceus Er., 5 specimens; 31.VII.1938, Midvale, N. J.

Lactarius piperatus Fries.

Staphylinidae.

Boletobius cingulatus Mann, 1 specimen; 30.VII.1939, Suffern, N. Y.

Atheta frosti Bnhr., 1 specimen; 30.VII.1939, Suffern, N. Y.

The following two species were baited at Little Neck, N. Y.

Stilicus dentatus Say, 1 specimen; 2.VIII.1939, Little Neck, N. Y.
Philonthus cruentatus Gml., 1 specimen; 2.VIII.1939, Little Neck, N. Y.

LACTARIUS VOLEMUS Fries.

STAPHYLINIDAE.

Bryoporus rufescens Lec., 1 specimen; 15.VIII.1938, Tenafly, N. J.
Atheta frosti Bnhr., 1 specimen; 15.VIII.1938, Tenafly, N. J.

RUSSULA EMETICA (Schaeffer) Persoon.

STAPHYLINIDAE.

Philonthus politus L., 1 specimen; 30.VII.1939, Suffern, N. Y.

NITIDULIDAE.

Pallodes silaceus Er., 1 specimen; 30.VII.1939, Suffern, N. Y.

EROTYLIDAE.

Tritoma angulata Say, 7 specimens; 30.VII.1939, Suffern, N. Y.

RUSSULA FOETENS (Pers.) Fries.

STAPHYLINIDAE.

Atheta virginica Bnhr., 5 specimens; 30.VII.1939, Suffern, N. Y.

The following two species were baited at Little Neck, N. Y.

Tachinus pallipes Grav., 2 specimens; 3.VIII.1939, Little Neck, N. Y.

MORDELLIDAE.

Mordella scutellaris Fab., 1 specimen; 3.VIII.1939, Little Neck, N. Y.

PANUS STRIGOSUS.

STAPHYLINIDAE.

Philonthus longicornis Steph., 1 specimen; 30.VII.1939, Suffern, N. Y.
Gyrophaena fasciata Say, 1 specimen; 30.VII.1939, Suffern, N. Y.

MYCETOPHAGIDAE.

Mycetophagus pictus Csy., 1 specimen; 30.VII.1939, Suffern, N. Y.

The following four species were baited at Little Neck, N. Y.

STAPHYLINIDAE.

Gyrophaena fasciata Say, 3 specimens; 3.VIII.1939, Little Neck, N. Y.

Atheta dentata Say, 1 specimen; 3.VIII.1939, Little Neck, N. Y.

NITIDULIDAE.

Stelidota geminata Say, 2 specimens; 3.VIII.1939, Little Neck, N. Y.

EROTYLIDAE.

Triplex thoracica Say, 1 specimen; 3.VIII.1939, Little Neck, N. Y.

RUSSULA CYNOXIA.

STAPHYLINIDAE.

Gyrophaena fasciata Say, 1 specimen; 30.VII.1939, Suffern, N. Y.

Atheta frosti Bnhr., 2 specimens; 30.VII.1939, Suffern, N. Y.

CLITOCYBE ILLUDENS (Schw.) Saccardo.

STAPHYLINIDAE.

Oxyporous femoralis Grav., 2 specimens; 11.X.1937, Tenafly, N. J.

Oxyporous lateralus Grav., 9 specimens; 11.X.1937, Tenafly, N. J.

TENEBRIONIDAE.

Platydema picilabrum Melsh., 1 specimen; 30.VII.1939, Suffern, N. Y.

The following specimen was baited at Little Neck, N. Y.

Hister abbreviatus Fab., 1 specimen; 3.VIII.1939, Little Neck, N. Y.

AMANITA PANTHERINA.

STAPHYLINIDAE.

Tachinus fimbriatus Grav., 1 specimen; 16.X.1938, Little Neck, N. Y.

Taken on species of BOLETUS.

STAPHYLINIDAE.

Boletobius cinctus Grav., 1 specimen; 12.VII.1939, Little Neck, N. Y.

HISTERIDAE.

Saprinus fraternus Say, 1 specimen; 12.VII.1939, Little Neck, N. Y.

NOTES ON THE MYCETOPHILIDAE OF THE GREAT SMOKIES MOUNTAINS.

F. R. SHAW, Amherst, Mass.

In June, 1939, Dr. C. P. Alexander collected extensively in the Great Smokies Mountains. The Mycetophilidae were examined by the author and many interesting records were obtained. In addition to the following list of specimens, several new species were found. These will be described in another paper to appear at a later date. The specimens with few exceptions, which are noted, were all collected by Dr. Alexander. The Sciarinae are not included in this list.

SUBFAMILY DITOMYIINAE.

Symmerus tristis Loew. Linville Falls, North Carolina. June 21 at an altitude of 3200 feet.

SUBFAMILY DIADOCIDINAE.

Diadocidia ferruginosa Meigen. June 6 at an altitude of 5500 feet.

SUBFAMILY CEROPLATINAE.

Palaeoplatyura johnsoni Johannsen. June 10 at an altitude of 2200 feet.

Ceroplatus johanniseni Fisher. June 6 at an altitude of 1900 feet.

Platyura apicalis Shaw. June 17 at an altitude of 3000 feet.

Platyura discoloria Meigen. Linville Falls, North Carolina, at an altitude of 3200 feet.

Platyura genualis var. Fisher. Some 75 specimens of this variety of *genualis* were collected between June 5 and June 21 at altitudes ranging from 2700 to 5500 feet. I believe that Miss Fisher will describe this insect as a new species as it appears to be quite distinct from *Platyura genualis.*

Platyura inops Coquillet. June 15 at an altitude of 2500 feet.

Platyura semirufa Meigen. June 10 at an altitude of 2200 feet.

SUBFAMILY MACROCERINAE.

Macrocera fisheri Shaw. June 5–15 at an altitude of 4000 feet.

Macrocera immaculata Johnson. June 10 at an altitude of 5500 feet.

SUBFAMILY SCIOPHILINAE.

Mycomyia alternata Fisher. June 9 at an altitude of 5500 feet.

Mycomyia imitans Johannsen. June 17 on Indian Gap Trail by

Cole and Hickman at an altitude of 2200 feet. June 22 on Bald Knob, Mitchell Range, at an altitude of 5500 feet.

Mycomyia littoralis Say. June 22 on Bald Knob, Mitchell Range, at an altitude of 5200 feet.

Neoempheria illustris Johannsen. June 9 at an altitude of 1900 feet.

Neoempheria impatiens Johannsen. June 17 at an altitude of 2200 feet. Collected by M. M. Alexander.

Boletina notescens Johannsen. June 5 at an altitude of 4000 feet.

Boletina notescens var. Johannsen. June 5 at an altitude of 2200 feet and June 22 on Bald Knob at 5200 feet.

Synapha bicolor Fisher. June 18 at an altitude of 2700 feet. Collected by W. H. Harrison.

Neuratelia scitula Johannsen. June 16 at an altitude of 3500 feet.

SUBFAMILY MYCETOPHILINAE.

Mycetophila mutica var. *a*. Johannsen. Mitchell Range, North Carolina, June 22, 1939, at an altitude of 3200 feet.

Polistes attacking Cicada—On August 4, 1940, I went to Lakehurst, N. J., and while walking to and fro during sweeping activities I suddenly heard a strange buzzing noise in a bush about twenty feet away. Approaching the bush cautiously and spreading the twigs, I discovered a small Cicada fighting off a *Polistes* wasp, the latter was apparently trying to embrace the cicada with its legs, but in vain. Each attack was repulsed by the cicada's violently beating wings. After waiting a reasonable time to see the outcome, and noting the futility of the combat, I picked up both.

Mr. Davis identified the cicada as a male *Tibicen canicularis* (Harr.) and mentioned that it would be very unlikely that a *Polistes* would attack a health cicada. This opinion was corroborated by the fact that this specimen was abnormal, its abdomen being deformed and shrunken.—BORYS MALKIN, New York City.

NOTOXUS BICOLOR SAY, A HOMONYM (COLEOPTERA, ANTHICIDAE).

By H. S. Barber, U. S. National Museum, Washington, D. C.

Another painful example of errors inevitably occurring in standard catalogues may serve to warn students that the older publications must be reanalyzed in connection with our modern usage of names. Quite by accident the familiar name *Notoxus bicolor,* heading an original description in a volume by G. A. Olivier 1795 (Ent. ou Hist. Nat. Ins., vol. 3, no. 51. p. 5), attracts attention and clashes with habitual usage of the same name for our commonest, best known, and most easily recognized species of Anthicidae. A short bibliographic recheck of original publications shows a situation entirely different in dates and synonymy from that indicated in the catalogue by Leng 1920 or in the Junk catalogue of Anthicidae by Pic 1911. The pertinent facts seem to be as follows:

1795 (1794?). Olivier (Ent., vol. 3, pt. 51, p. 5, pl. 1, fig. 4) describes and figures an anthicid of unknown habitat under the name *Notoxus bicolor.* This is cited in Pic 1911 (Junk, Coleop. Cat., pt. 36, p. 53) in synonymy of *Anthicus hispidus* Rossi 1792 but with no mention of its original generic assignment.

1817. Say (American Entomology, published by Mitchell and Ames, Philadelphia, unnumbered pages explaining plate 4) describes our two common species under the names *Notoxus bicolor* (new) and *N. monodon* (F.). This early publication is not found in the "Complete writings of Thomas Say."

1824. Say (American Entomology, pl. 10 and text) redescribes the same two species treated in 1817, but rejects the name *Notoxus* because it had been adopted in the meantime by European naturalists for a very different genus of insects and uses the combination *Anthicus bicolor.*

1824. LeConte (Ann. Lyc. Nat. Hist., New York, vol. 1, p. 170, pl. 11, fig. 3) describes and figures *Anthicus murinipennis* living on flowers in Georgia. This is wrongly dated 1851 and synonymized under *bicolor* Say in Pic 1911 and in Leng 1920.

1827. Say (Contrib. Maclurian Lyc. Arts & Sci., vol. 1, p. 38) mentions the identity of *A. murinipennis* Lec. and *A. bicolor.*

1859. LeConte (Complete writings of Thomas Say) seems to have overlooked the significance of the 1817 issue of Say's American Entomology which Say 1824 mentions as "never properly published."

1870. Gemminger and Harold (Catal. Coleop., vol. 7, p. 2090) suppress *murinipennis* under *bicolor* Say 1824 but erroneously cite vol. V, instead of vol. I, under the LeConte name.

1883. LeConte (Complete writings of Thomas Say). Same as 1859 and other unauthorized editions.

Not only is it necessary to reverse the synonymy indicated in Pic 1911, but the dates there ascribed to both names and copied into the Leng catalogue require correction. The synonymy of the species commonly known for nearly a century and a quarter as *Notoxus bicolor* Say (Leng cat. no. 8283) should be:

Notoxus murinipennis (LeC.).
    Notoxus bicolor Say 1817 (not *N. bicolor* Oliv. 1795).
    Anthicus bicolor Say 1824.
    Anthicus murinipennis LeC. 1824.

The type locality of this species thus changes from southeastern Pennsylvania to the vicinity of the LeConte home in northeastern Georgia.

A New Record for Lipoptena cervi L. in New York State.[1]—On March 6, 1935, State Game Protector John A. Farrell, of Indian Lake, Hamilton County, N. Y., found a male fawn (*Odocoileus virginianus borealis*) in poor condition and immediately transferred it to shelter where it subsequently died. It was received for post-mortem examination at the Laboratory of Wildlife Pathology, New York State Conservation Department, Delmar, N. Y., on March 9, 1935, and was autopsied by Dr. E. K. LeDune who reported pneumonia and uremic poisoning due to urethral occlusion by small calculi. No internal parasites were observed but two species of external parasites were saved for subsequent identification. These parasites were found to be *Tricholipeurus virginianus* Peters, a Mallophagan parasite which occurred in thousands upon the body, and two Hippoboscids, *Lipoptena cervi* L., which had been collected from the neck region. This is the first record of *Lipoptena cervi* L. from New York State.—Eugene J. Gerberg and Frans C. Goble.

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[1] Contribution from N. Y. State Wildlife Research Center, Delmar, N. Y.

NOTE ON THE FEEDING HABITS OF BROCHYMENA CAROLINENSIS (WEST.) IN FLORIDA.

By Herbert Ruckes, College of the City of New York,
New York City.

Whenever observations lead to discovery of new facts concerning habits, particularly dietary ones, of insects whose known behavior has been recorded only sketchily in the literature, it is always a good idea to publish such discovery for the benefit of future workers in the field.

During the past summer (1940) the author was fortunate enough to be able to spend two months in Florida, collecting insects and observing their habits. In this period some ten days were occupied in collecting in the vicinity of Orlando and Winter Park. On Route U. S. 441 at a small community called Fairvilla is the Pine Grove Tourist Camp. The cabins are built in the midst of a fine stand of the two long-leafed pines, *Pinus palustris* Mill., the Georgia yellow pine and *Pinus Caribaea* Morelet, the slash pine. It was on both these species that the pentatomid *Brochymena carolinensis* (West.) was found in abundance, usually busily engaged in feeding from the tree trunks.

The insects were found only between the hours of eight and eleven in the morning, not in the middle of the day and afternoon, occasionally at dusk and not during the night. During their periods of activity they take their positions in the wider crevices and cracks of the thick bark, selecting trees of about eight to ten inches in diameter, not frequenting smaller ones and occurring rarely on those of larger size. Almost every one of the hundred specimens taken was found within the basal five feet of the trunk, always on the shaded side of the tree and in a goodly number of instances, facing downward.

The selection of the deeper crevices and cracks not only offers physical protection to the bugs while engaged in feeding but also allows them to choose the smooth, flat, thinner bark at the bottoms of these cracks for their punctures. The beak of *Brochymena* is of the long thin type characteristic of the plant feeding pentatomids and not of the short stout type present in their predatory relatives. Hence they cannot satisfactorily pierce plant tissue of great thickness such as is presented by most of the bark surface of pines. *B. carolinensis* feeds apparently on the resinous deposits either in or just below these thin patches of the bark.

In the characteristic feeding posture the beak assumes a zig-zag position. The first or proximal joint is retained horizontally within the folds of the bucculae; the second is directed forward at about a forty-five angle to the first; the third is extended backward at about a sixty degree angle to the second and the last and shortest one is bent at about a hundred and twenty degree angle to the third. The last joint is inserted for about half to three quarters of its length into the trunk. It thus can reach only into the bark or, if the latter happens to be thin enough, just below it to feed on the resinous deposits there and cannot tap the deeper fluids and sap of the tree. The fluid pitch apparently is its principal dietary component.

While feeding, the majority of the bugs raise their bodies in such a manner that the posterior end of the abdomen is well above the level of the head, i.e., the whole animal is inclined.

The limited time of activity as stated above is undoubtedly correlated with the temperature factor. Inactivity occurs during the heat of the day and comfort is found in the earlier morning and evening hours and in the shade. During the latter part of the morning it seems that these bugs ascend the trunks of their trees and during their resting periods nestle in the bases of the clusters of long pine needles. I have found them there but they were not feeding, although all conditions were favorable for their doing so. During the night they probably stay in the higher reaches of the trees and descend in the early morning to repeat their search for favorable feeding spots on the lower parts of the trunks.

I believe that this is the first record of the actual feeding by these bugs on pine. It has often been stated that they have been captured, resting on pine or hibernating beneath the bark but as far as I know there is no authentic statement that says that they suck the fluids of the tree. Pine juice is, apparently, a delectable diet for them. I wonder what nourishment there is in it for them.

Cicindela Patruela on Long Island—While examining the collection of Mr. Ragot I noticed two specimens of *Cicindela patruela* Dej. taken by him at Alley Pond on July 4, 1937. It is interesting to note that whereas the original species is to be found in some mountainous regions of New York State, the variety *C. patruela consentanea* Dej. is confined to the pine barren regions of Long Island.—BORYS MALKIN, New York City.

VALIDITY OF THE SPECIES HELIOTHIS SUBFLEXA (GN.) (LEPIDOPTERA).

By Rowland R. McElvare, Port Washington, L. I., N. Y.

A comparative study of *Heliothis virescens subflexa* (Gn.) and *Heliothis virescens* (F.) indicates definite and persistent structural differences in the genitalia and in the larvae which suggest that full species status should be restored to *subflexa.*

Heliothis subflexa was described by M. Achille Guenée in 1852 (Species Géneral des Lépidoptères, II, 175, 1852, *Aspila*). It was still accepted as a valid species in 1902 by Dyar in his List of North American Lepidoptera (No. 2297, *Chloridea*) and in 1903 by John B. Smith in the Check List of the Lepidoptera of Boreal America (No. 2501, *Chloridea*). In the latter year, however, Hampson in the Catalogue of the Lepidoptera Phalaenae in the British Museum relegated it to the status of one of four varieties of *Chloridea virescens* (F.). Barnes and McDunnough's Check List of Lepidoptera, 1917 (No. 1091a) and Dr. McDunnough's Check List of Lepidoptera, 1938 (No. 2933a) show it as a geographical race of *virescens* (*Heliothis*).

Heliothis virescens (F.) is a common moth characterized by a yellowish green forewing with three prominent whitish oblique bands, paralleled by darker green on their outer sides. The hind wing is white with a dark band on the margin which varies greatly in extent. *H. subflexa* differs from *virescens* by the absence of the band on the hind wings which are immaculate.

Preparation of a series of slides of male genitalia reveals the following differentiating structural characters: In *subflexa,* hair tufts are found on each side of the eighth abdominal segment; the base of the vinculum is an elongated curve terminating in a point; the length of the harpes ranges from 4 mm. downward. In *virescens,* the abdominal hair tufts are absent; the base of the vinculum is rounded; long hair pencils extend from the base of the harpe to the tip; and the length of the harpes ranges from 4 mm. upward.

Comparison of female genitalia at the United States National Museum reveals differences which justify specific separation. The ductus bursae of *virescens* is strongly constricted before the ostium. Anterior to this constricted membranous portion, the ductus bursae is ribbed with longitudinal sclerotized ridges. The structure of *subflexa* is similar but the membranous portion of the ductus bursae before the ostium is twice as broad and about half as long as that of *virescens* and the portion anterior to it is sclerotized in the form of crinkly ridges.

Comparison of the larval stage was made from material preserved in alcohol. Accordingly too much stress should not be laid on color differences, which also vary with the food plant and the stage of the larvae. An examination of the standard pattern surrounding the abdominal spiracles indicates marked structural differences. In *subflexa,* the spiracle is surrounded by four heavily pigmented sclerotizations or tubercles at the bases of abdominal setae III, IIIa, IV, and V, respectively: a very prominent tubercle above, two of medium size posteriorly and ventrally, and a small anterior tubercle. In *virescens,* the dorsal and posterior tubercles are both of medium size, the ventral one is smaller and somewhat distant, while the anterior tubercle has dwindled to microscopic proportions.

The various differences cited above go beyond those of geographical variety or race. They are not isolated phenomena in individual specimens. They are substantial in number and definite in character. They occur in both larval and adult forms. Most of them, being structural, are not the result of local variations in temperature or moisture. In the aggregate they justify the recognition of *Heliothis subflexa* (Gn.) as a valid species. Because of the economic importance of *Heliothis virescens* (F.) (True Bud-worm on tobacco, etc.), economic entomologists might well follow out this differentiation of *subflexa* with a view to determining its biological implications. Food plants of *subflexa* are reported to be deadly nightshade (*Solanum nigrum* L.) and various species of ground cherry (*Physalis* L.).

Acknowledgment should be made to Mr. J. F. Gates Clarke, Entomologist, U. S. Bureau of Entomology and Plant Quarantine for various helpful suggestions and to Mr. H. W. Capps, also of the Bureau, for critical comment on larval differentiation. The larval material and most of the *subflexa* specimens used in this study were made available by the United States National Museum through Mr. Clarke. Their enlightened policy of making material available for study instead of burying it in storerooms is an important contribution to the solution of special problems which otherwise it would not be practicable for students to undertake.

NEW SYNONOMY IN THE SCHIZOPINI (COLEOPTERA, BUPRESTIDAE).

By Mont A. Cazier, University of California, Berkeley.

In a recent publication by Obenberger[1] on the Schizopini of North America a new genus and species was proposed. The description of this genus and species appears to represent a deliberate attempt to belittle and disregard certain American systematic workers and shows a lack of knowledge of recent literature on the group. It seems desirable and pertinent, at this time, to point out a few of the facts bearing on this malpractice in order to assist in effecting a remedy for this unethical method of increasing our already cumbersome synonomy. Fortunately for all systematic workers this practice persists in relatively few workers today. The following quotation from a letter written by Obenberger and sent to J. R. Helfer is self-explanatory. "You have sent me one specimen of *Schizopus laetus* Lec. This species has, however, nothing common with the species and genus of Leconte. I have received for comparison a second specimen from Dr. W. Horn of Berlin. This badly determined species is in reality a new genus of Schizopini and also a new species. I have already described it under the name of *Yermoëlla helferi* n. sp. It is interesting to constate a new such species of greatest interest nearly before the nose of my friend ———— [One of our foremost authorities on Coleoptera. M. C.] I beg you to not divulge these news before receiving the respective paper from me / in some days/ and I will be extremely thankful to you for further specimens. The sp. from Berlin is twice so great as that sent from you and it was there under the same erroneous denomination. *Sch. laetus* is an elongate species of brownish colour and yellowish feet."

The female specimen submitted to Obenberger by Helfer, in an exchange, correctly labeled as *Schizopus laetus* Lec. was one of many specimens collected in 1937 by F. T. Scott and a number of other collectors. Le Conte's description was of the male only but the sexual dichromatic feature of the species was observed and recorded many years ago. The morphological differences given in the description of *Yermoëlla helferi* are the secondary sexual characteristics and, as Obenberger himself admits, the two specimens examined were both females. Dissections and notes made by the writer[2] and the observations of Helfer, who captured the dichromatic forms in copulation, show, without doubt, that *Yermoëlla helferi* Oben. is a synonym of *Schizopus laetus* Lec. The absence of any comparative notes in the descriptions of both *Yermoëlla* and *helferi* is indicative of the quality of much of Obenberger's systematic work. Few if any of his North American species are valid, many represent our earliest described, common and widespread but often somewhat variable species. The descriptions given are so inadequate that it is often difficult or impossible to place these synonyms correctly. The situation is further complicated by having the types, which are too often single specimens, in collections not readily accessible to workers in this country.

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[1] Obenberger, J., 1939, Über eine neue Buprestiden-Gattung und- Art aus den Sammlungen des Deutschen Entomologischen Instituts nebst einigen Bemerkungen über die Buprestiden-Tribus Schizopini sensu Kerrman. Arb. morph. taxon. Ent., Berlin-Dahlem, 6: 254–265 (3).

The recognition of *Dystaxia lecontei* Thoms. as a subspecies of *D. murrayi* Lec. by Obenberger is unjustified. The species had previously been shown to be nothing more than a newly emerged and imperfect specimen of *D. murrayi* and has appeared correctly in our lists as a synonym of that species.

The arrangement of the species and genera in the *Schizopini* should appear in our lists as given below.

Glyptoscelimorpha Horn.[3]

Glyptoscelimorpha Horn, G., 1893, Trans. Amer. Ent. Soc., 20: 137.

1. *G. marmorata* Horn, G., 1893, Trans. Amer. Ent. Soc., 20: 137.
2. *G. viridis* Chamberlin, 1931, Pan-Pac. Ent., 8: 47.

Dystaxia Le Conte.

Dystaxia Lec., 1866, Proc. Acad. Nat. Sci., Phila., p. 385.

1. *D. elegans* Fall, 1905, Ent. News, 16: 71.

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[2] Cazier, 1939, Notes on the Genus *Schizopus* with a key to the Species. Pan.-Pac. Ent., 15: 85–86(2).

[3] The description of a new genus and species, *Dystaxiella juniperae* Knull, has added additional names in this section. The genus *Dystaxiella* is most closely allied to *Glyptoscelimorpha* but its validity as a separate genus is questionable; the species is very distinct, however, and should be included in this section. Knull, J. N., 1940, Two New Buprestidae, The Ohio Journal of Science, 40 (6): 362–363.

2. *D. murrayi* Lec., 1866, Proc. Acad. Nat. Sci., Phila., p. 385.
   D. lecontei Thomson, 1879, Typi Buprestidarum Mus. Thoms. App. la, p. 6. (New Synonym.)

Schizopus Le Conte.

Schizopus Lec., 1858, Proc. Acad. Nat. Sci., Phila., p. 70.
Yermoëlla Oben., 1939, Arb. morph. taxon. Ent., Berlin-Dahlem, 6: 263–264 (3), (New Synonym).

1. *S. laetus* Lec., 1858, Proc. Acad. Nat. Sci., Phila. p. 70 (male).
   S. helferi (Oben.), 1939, Arb. morph, taxon. Ent., Berlin-Dahlem, 6: 264–265, female, (New Synonym).
2. *S. sallei* Horn, 1885, Trans. Amer. Ent. Soc., 12: 145.

Concerning the Distribution of Ataenius miamii Cartw.—In his recent paper on West Indian Aphodiinae (Proc. U. S. N. M. 1940), Dr. E. A. Chapin lists *Ataenius miamii* Cartw. from St. Croix, St. Kitts, and Barbados. In the addenda in the same paper he regards *At. Havanensis* Balthasar as synonymous with *miamii* and thus adds Cuba to the list. Since Dr. Chapin suggests that the Florida specimens (type series 1934) were "almost certainly recent arrivals from some West Indian Island," it may be of some interest that in addition to specimens from the type locality, Miami, Florida, I have recently examined specimens bearing data as follows: Fredricksburg, Virginia, IX–18–04, Wm. Richardson (U. S. N. M. Collection); Lakehurst, New Jersey, 9–4–23, L. B. Woodruff (Mark Robinson Collection); Spring Hill, Alabama, 7 Apr. 1911, H. P. Loding (H. P. Loding Collection); and 44 specimens, Clemson, South Carolina, 30 August 1940, O. L. Cartwright.—O. L. CARTWRIGHT, Clemson, South Carolina.

PROCEEDINGS OF THE SOCIETY.

Meeting of November 16, 1939.

A regular meeting of the Brooklyn Entomological Society was held at the Brooklyn Museum on Thursday evening, November 16, 1939. President William T. Davis presided, and seven other members were present, namely, Dr. Tulloch and Messrs. Buchholz, Dietz, Gaul, McElvare, Sheridan and Siepmann, also Miss Dietz, Miss Sophie Salter, and Messrs. Arnold Goldberg, Joseph Monachino, F. T. Naumann, and Harold I. O'Byrne.

The minutes of the previous meeting were read and accepted, and in the absence of Mr. Engelhardt, Mr. Davis reported briefly for the Treasurer.

Mr. Sheridan conveyed the best wishes of Dr. Dietrich, whom he had recently seen, and who is now at Ithaca.

Mr. William T. Davis addressed the society on the subject of "Some Interesting Cicadas," showing specimens, among them *Tibicen duryi* Davis from New Mexico, which has red veins like an *Okanagana* instead of black as in the other species of *Tibicen.* Mr. Davis also spoke of his observations of the cicada killer, *Sphecius speciosus.* This large wasp provisions its nest with cicadas. The tunnels are usually made in dry sandy places, but not always so. Mr. Davis has even seen them in salt meadows, right next to fiddler crab burrows. The female can be recognized by the two long spines of the hind tibiae with which the earth is thrown from the burrow. It has been suggested that our great velvet ant, *Dasymutilla occidentalis* is a parasite of the Cicada killer, but the relationship has not yet been definitely established. Mr. Davis, on two occasions, saw this velvet ant looking into the burrows of the cicada killer.

Mr. Davis also showed cicada cases from New Dorp, Staten Island, which are more reddish in color than those from the northern part of the island, some artificial cicadas that he had received from friends, and a copy of the book "Insect Singers" by Meyers, which treats of cicadas, their songs, their use in medicine, and references to them by the ancients.

Mr. McElvare showed a copy of a book published in 1938: "An Ecological Glossary," by J. Richard Carpenter, and said that the book was of interest to entomologists. Mr. McElvare also showed specimens of a common Heliothinid moth from California, *Heliothis phloxiphaga* G. & R., the dark variety, form *luteitinctus* Grt., and an undescribed light form. The first specimens of the light variety were from the mountain states of the west and it was at first thought to be a local variety found in the mountains, but now eight specimens are known, two of which were found by Mr. H. H. Walkden on Calendula in his garden on the flat plains of Kansas.

The meeting adjourned at 9:30 P.M.

CARL GEO. SIEPMANN,
Secretary.

MEETING OF DECEMBER 14, 1939.

A regular meeting of the Brooklyn Entomological Society was held at the Brooklyn Museum on December 14, 1939. President William T. Davis called the meeting to order at 8:15 P.M. Eleven other members were present, namely, Dr. Tulloch and Messrs. Buchholz, Dietz, Engelhardt, Gaul, McElvare, Moennich, Sheridan, Shoemaker, Siepmann and Teale, also Miss Goldman and Messrs. J. L. Bassen, Abe Dury, Arnold Goldberg and Warren Holm.

The minutes of the previous meeting were read and approved. Mr. Engelhardt presented a brief report as treasurer, stating that all current bills were being paid as presented, and read a letter from the editor, Mr. Torre-Bueno. He also showed a copy of the first number of the Indian Journal of Entomology, a new publication which looks very promising. It is issued by the recently organized Entomological Society of India, at New Delhi, with branches elsewhere in India.

The death, in November, of Dr. H. C. Fall, of Tyngsboro, Mass., one of the outstanding authorities on North American Coleoptera, was announced by Mr. Engelhardt. Dr. Fall had a large collection which was bequeathed to the Museum of Comparative Zoology at Cambridge, Mass. Mr. Engelhardt also reported that Kenneth W. Cooper was appointed an instructor in the department of biology, Princeton University.

Mr. Davis read a letter received from the Department of State, Washington, regarding the Eighth American Scientific Congress, to be held May 10 to 18, 1940, celebrating the 50th anniversary of the founding of the Pan-American Union. The Brooklyn Entomological Society was invited to participate.

Mr. Davis appointed a nominating committee to consist of Messrs. Sheridan, Shoemaker and Gaul.

Dr. George S. Tulloch addressed the society on the subject of "Mosquitoes and Equine Encephalomyelitis." This disease affects horses and mules and is popularly known by such names as sleeping sickness, Kansas-Nebraska horse plague, blind staggers, etc. As the scientific name implies, the disease affects the brain and spinal cord of the afflicted animal.

In horses and mules the disease presents three stages. In the first stage the animal has a mild indisposition and slight fever which generally goes unnoticed. In the second stage there is no desire for food or water, the animal grinds his teeth and has a tendency to stumble, and a foul discharge flows from the nostrils and eyes. In the third stage the horse can no longer stand without support, and when lying down is quiet and breathes slowly. Death frequently ensues in two or three days.

Equine encephalomyelitis occurs throughout the Uinted States, being particularly prevalent in the central states. In 1938, 165,000 equine cases were reported in the United States, with a mortality rate ranging from 15% to 97% in various sections.

Prior to 1930 many theories were advanced as to the cause of equine encephalomyelitis. Such things as spoiled food, bacteria, etc., were suggested. It was not until 1930 that a group of workers under Meyers in the San Joaquin Valley, California, isolated a filterable virus which was responsible for this disease. A virus is an ultramicroscopic structure whose presence can be determined by laboratory methods. Among the diseases caused by filterable viruses are measles, chicken pox and possibly the common cold.

Two viruses responsible for equine encephalomyelitis are known, a western strain and an eastern strain. Both produce the same type of symptoms, but their difference can be demonstrated by laboratory methods.

No cure for the disease is known, but a type of vaccine has been developed to be injected into the horse which provides immunity for a short period, but long enough to get the animal through the comparatively short season the disease is most virulent. The cost of such vaccination, ranging from four dollars per animal and upward, however, is more than many farmers can afford to pay.

In 1938 there was in Massachusetts an epidemic of equine encephalomyelitis affecting large numbers of horses. The number of cases rose rapidly in the second week of July, reached a peak in the beginning of August, and declined rapidly.

At about the same time a disease was reported affecting children in the same region, which was generally diagnosed as sleeping sickness. This disease reached a peak one week later than the disease in horses, and fell off at about the same time. Noting the similarity of symptoms in horses and children, a Brockton physician suggested, in a newspaper article, that the disease affecting the horses affected the children as well. This view did not receive immediate acceptance, but on September 2 a small child in Marshfield, Massachusetts, near Brockton, died of the disease in question. The child's brain was secured, and parts were sent to Washington, Rockefeller Institute and Harvard University for examination. All three sources reported on the same day, namely, that the virus present in the child was the same as that causing equine encephalomyelitis in horses.

The disease affected 40 children in Massachusetts, of whom 26 died. No cases are known outside of that state. In children the symptoms are drowsiness, often convulsions, and a definite bluish discoloration of the skin. Death often occurs in two days. In human beings only the brain is affected, and not the spinal cord, and hence it is known simply as encephalitis. This, however, is a general term, referring to several distinct brain diseases, and Dr. Tulloch made it clear that he was speaking only of the type which is caused by the equine virus.

In Massachusetts both equine and human cases of the disease take a similar and interesting distribution. This was clearly shown on a map. Practically all of the cases were in the eastern third of the state. Cape Cod, strangely enough, however, reported no cases. It seems that the disease spread northward from Rhode Island, and it is the feeling of some that diseased horses entering the Naragansett, R. I., race track introduced the disease which subsequently spread northward.

It is not known how this disease is transmitted in nature. From its distribution in Massachusetts, and from its occurrence at the height of the mosquito season, mosquitoes were soon suspected as possible carriers. In the human cases there was almost always a history of a mosquito bite. If this disease is mosquito borne, then it is the first mosquito borne epidemic in the United States in the latitude of Massachusetts.

In 1939 the state of Massachusetts conducted some definite experiments. A group of 150 W.P.A. men were obtained to collect mosquitoes. They were given a brief training in their work at the Medical School in Harvard. The state was divided into 18 units, and a crew of men visited each town in the state at least once a week. Adults and larvae were collected and sent to Boston for identification. Some weeks as many as 100,000 specimens were classified and tabulated. Punched cards that were run through machines sped up the work of tabulating the data. As a result Massachusetts now has an accurate census of mosquitoes. No state has ever been worked over so intensively. Nine new forms were added to the C. W. Johnson list of the mosquitoes of that state, some being new to New England, and one never before reported north of New Jersey.

By experiments conducted in the laboratory it has been shown that eight of the species of mosquitoes occurring in Massachusetts can carry the disease from animal to another. This does not, however, prove that this happens in nature. Mice and guinea pigs carry the virus in their bodies for a certain length of time. Mosquitoes are known to carry the virus in their bodies for long periods.

Special search was made for mosquitoes in the neighborhood where cases of encephalomyelitis were reported the preceding year. Light traps were used to collect mosquitoes, which were brought to the laboratory alive and separated into one on the 35 species occurring in the state. All lots were ground in a salt solution, which was centrifuged and injected into the brains of laboratory animals known to be free from the disease. No animal so injected contracted it.

Aedes sollicitans was thought a possible spreader of the disease, but its distribution does not coincide with that of the encephalomyelitis. *Mansonia perturbans* has a distribution similar to that of the disease, but it is one of the species which did not transmit the disease in the laboratory. If *Mansonia* were responsible, it would be a particularly difficult species to control, because the larvae obtain their air by attaching themselves to the roots of plants, instead of rising to the surface of the water.

The meeting adjourned at 9:30 P.M.

Carl Geo. Siepmann,
Secretary.

Meeting of January 11, 1940.

A regular meeting of the Brooklyn Entomological Society was held at the Brooklyn Museum on Thursday, January 11, 1940. President William T. Davis presided, and nine other members were present, namely, Dr. Tulloch, and Messrs. Buchholz, Dietz, Engelhardt, Gaul, McElvare, Shoemaker, Siepmann and Teale, and ten visitors, including Mr. & Mrs. E. G. Jewett, and Messrs. John J. Bowe, Frederick V. Clark, John Elfstrom, James T. Farrelly, Jr., and Warren Holm.

The minutes of the previous meeting were read and accepted. Mr. Engelhardt presented the annual report of the treasurer, stating that the society now has 42 active members, 3 life members, and one honorary member. Subscribers to the Bulletin number 220, to *Entomologica Americana,* 161. Income from the Bulletin was $621.05 in 1939 compared with $514.25 the preceding year. Income from *Entomologica Americana* was $645.00 in 1939 compared with $436.15 the year before. Income from the *Glossary* was $605.09 in 1939 compared with $1,479.08 the year before. The large number of sales of the *Glossary* in 1938 were those immediately following the publication of the book.

Mr. Engelhardt read the annual report of the publication committee, which was prepared by Mr. Torre-Bueno.

Motions were made and carried to the effect that the reports of the treasurer and of the publication committee be accepted with thanks, and that the secretary be instructed to notify Mr. Torre-Bueno that this action was taken.

Mr. Engelhardt proposed for membership Mr. Borys Malkin, 55 West 11th St., New York City. The proposal was deferred until the February meeting.

Mr. Shoemaker, reporting for the nominating committee, recommended that the present officers of the society continue in office. There were no other nominations, and the recommendations of the committee were adopted.

Mr. Albro Tilton Gaul spoke on the "Biology of the Northeastern Hornets." The Vespinae, popularly known as hornets and yellow jackets, are social wasps well known for their stinging propensities. They are distinguished from their relatives by the angle of the pronotum extending to and above the tegula, wings folded at rest, simple claws, and truncate abdomen. Three genera are known, one of which is oriental. Our two genera are *Vespa,* in which the head is swollen behind the eyes, and *Vespula,* in which it is not. *Vespula,* in turn is divided into *Vespula* proper and *Dolichovespula;* the latter has the face prolonged between the eyes and mandibles. *Vespula* is a terrestrial genus; the others live above ground. *Dolichovespula* builds the familiar aerial paper nest.

In the United States *Vespa* is represented by but one species, *Vespa crabro,* introduced from Europe. It is well established here, but occurs only within about 75 miles of New York City.

Vespula is represented by several species, the commonest of which are *maculifrons* and *vulgaris.* They are difficult to distinguish except by the male genitalia. Our commonest species of *Dolichovespula* are *arenaria,* which is yellow and black, and *maculata,* which is black and white.

The queen hornet hibernates beneath bark or under logs, and is the only member of the colony that lives through the winter. In the early spring she comes out and selects a nest site, where she makes a small comb and lays a few eggs. When the eggs hatch, the queen feeds the larvae and enlarges the nest. As soon as the workers emerge, the queen restricts herself to egg-laying, and the workers perform the duties of freeing the young and enlarging the nest.

In almost all species of *Vespinae* there are three castes, the queen, the male and the workers. The latter are imperfect females. The queen and workers have a complete chromosome makeup. The male is haploid, having only half the number of chromosomes. The sperm cells are produced by a modified mitosis, and have the same number of chromosomes as the male cells. A fertilized egg produces females, while an unfertilized egg produces males.

As the queen lays her eggs in the comb, she begins in the center and works around concentrically. The cells are inverted, and the eggs are fastened to the nest by a cement. The larva secretes a mucilaginous substance by means of which it clings to the nest, and later develops pleural lobes with which it can cling to the nest by friction. The larva does not excrete any waste matter until it spins its cocoon and becomes a pupa. As the successive broods are reared in the cells of the preceding brood, it is possible to tell the number of broods for a particular nest by counting the pellets of excreted matter. There are usually three or four broods a season.

Toward the end of the season the queen lays the eggs which are to be next season's queens. In most species the workers are smaller than the queens, and therefore larger cells are built for the queen eggs. It is the theory of Wheeler that at the beginning of the season there is not much insect food, but toward the end more and different food is available, so that those larvae which are better fed become queens. However, queen cells are made larger by the workers ahead of time, and the theory leaves much to be explained.

After a colony is on the downgrade at the end of the summer, the adults that remain revert to cannibalism and suck the juices out of the larvae.

The adult hornet uses the biting parts of her mouth to obtain potential food. She catches a caterpillar or other insect, which she bites, but does not sting. The body of her prey is mixed with her salivary juices and made up in the form of a pellet and fed to the larvae. The worker bringing food to the nest is met by two or three other workers who divide up the food and feed the young.

The adult hornet cannot eat solid food, but obtains nourishment from nectar and plant juices. And by the process of trophallaxis, the adult taps at the mouth of the larva, which regurgitates fluid nourishment from its glands. This is eaten by the worker. The queen and male also feed on trophallactic juice.

A division of labor exists among the workers. The young workers have soft chitin and stay in the nest. They distribute the food the older workers bring in, tear out paper as the nest enlarges, and stand "guard" at the doorway, beating their wings to keep the air in circulation. The older workers go out to gather food and wood for paper. They usually use old wood, which they scrape with their mandibles and mix with saliva to make a wood pulp. *Vespa crabro* uses fresh wood that it tears from living branches.

Two species of Northeastern hornets are parasitic. *Dolichovespula adulterina* var. *arctica,* a black hornet, is an inquiline in the nest of the aerial yellow jacket, *Dolichovespula arenaria.* The queen enters the nest of the host, and lays eggs in the cells. The workers of the original nest treat them as their own. Eventually the invading species predominates. The inquiline species has no workers, and the queen and male are of small size, like the workers of the host.

Hornets are attacked by many parasites, such as ichneumons, chalcids, nematodes and bacteria. If a bacterial or protozoan parasite is present in one individual in a colony, it is usually present in all of them. It is likely that the process of trophallaxis presents excellent chances for infection.

Vespula lives in underground nests. The queen is said to be clever in selecting a nest site, usually an old and deserted rodent burrow, but perhaps the credit for selecting the nest site should go to the rodent rather than the hornet. The nests are usually large with six or eight plates of combs. Sometimes five or six thousand eggs are laid in a single nest.

Mr. Gaul has studied the wasps in hives which he has constructed in the windows of his home. He collected the nest at night, when all the hornets are inside. Some ether is poured into the nest, and the entrance is plugged up. The nest can then be cut down, and placed in the hive. The entrance to the hive is left closed until the following morning, and the wasps stay there indefinitely and continue to build on the original nest. Mr. Gaul has found that if the hive entrance were left open when the nest was placed in it, the hornets would go near the old nest site when they recovered from the effects of the ether, and build a new nest. Species of *Vespula* which live below the ground can also be placed in a window hive, and will live above the ground.

In two species of *Dolichovespula* the queens have been observed to tap on the brood comb with the tip of their abdomen. The queens are the only ones who do this, usually around half past two in the afternoon, and there is apparently no connection with trophallaxis as in *Polistes.*

Mr. Davis showed a nest of *Vespa crabro,* and said that this species particularly likes lilac and ash for making paper.

The meeting adjourned at 9: 50 P.M.

CARL GEO. SIEPMANN,
Secretary.

MEETING OF FEBRUARY 15, 1940.

A regular meeting of the Brooklyn Entomological Society was held at the Brooklyn Museum on Thursday, February 15, 1940. President William T. Davis called the meeting to order at 8:30 P.M. Those in attendance were Mr. Buchholz, Mr. McElvare, Mr. Nicolay, Mr. Sheridan, Mr. Gaul, Mr. Engelhardt, Mr. Davis, Dr. Tulloch, and a visitor, Mr. Malkin.

In the absence of the secretary, Mr. Gaul was appointed to take the minutes of the meeting.

An encouraging informal report was rendered by the Treasurer.

Mr. Borys Malkin, of 55 West 11th St., New York City, who was proposed for membership at the January meeting by Mr. Engelhardt, was unanimously elected into the society.

Mr. Engelhardt read an acknowledgement of our condolences from the family of the late Dr. Walter Horn of Berlin. Dr. Horn was an authority on the Cicindelidae and has written 390 papers on that group.

Mr. Sheridan generously offered to send a paper to those interested, giving instructions for mounting insects for microscopic study.

Mr. Gaul showed a specimen of *Tibicen canicularis* Harris, that was taken in the web of a spider. It is the first record of this species being entrapped in a spider nest. Mr. Davis called attention to the atypical head of this specimen which was about a millimeter narrower than the usual head.

Mr. Engelhardt showed a group of scarabaeid beetles. Last year the grubs of these beetles were so prevalent on his lawn in Hartsdale, that the turf could be rolled up like a rug. Mr. Engelhardt placed some of these larvae in a breeding cage and was surprised to find that none were specimens of the Japanese Beetle, *Popillia japonica.* As the Japanese beetle is a constant pest in Hartsdale, it is surprising not to find them in the lawn. The specimens shown were: *Anomala orientalis* (commonest scarab next to *P. japonica*), *Pachystethus lucicola, Ontoserica castanea, Diplotaxis* sp., and *Popillia japonica.*

Mr. Buchholz spoke on his collecting trip in the Carolinas. Mr. Buchholz has collected in many parts of the country, in Maine, the Adirondacks, the Catskills, in the west and the southwest. Present collections represent our southeastern states very sparsely, especially in the Lepidoptera. Last summer Mr. Buchholz collected near Wilmington, North Carolina. The land here is very flat from the seacoast to about 200 miles into the interior. The terrain is mostly swamp and bog land. The woods are mostly cedars, some reputed to be up to 8 feet in diameter. Mr. Buchholz has seen them up to 3 feet. The only access to the swamps is along railroad and road embankments. As drainage ditches run along such embankments, collecting is limited to these places and it is exceedingly difficult to get into the actual swamp ground. In one instance, Mr. Buchholz found that the depth of the ditch was well up to his chest.

Near Wilmington Mr. Buchholz found an abandoned road that led to a former ferry dock. There was an abundance of pickerel weed here that attracted a variety of butterflies.

In the Virginia Dismal Swamp, Mr. Buchholz collected along a lumber railroad embankment. Here there were hundreds of papillios of six species, all travelling in a westward direction. In all 73 species have been collected from this area, many of them reputedly rare.

The butterflies are commonest in wet seasons with intermittent sunshine. The drained and cultivated lands have no butterflies, or only those of the barren waste lands.

Mr. Buchholz reported finding specimens of Venus' flytrap abundant in circumscribed areas.

Mention was made of the difficulties of swamp collecting, red bugs, sheep ticks, mosquitoes and ants being responsible for these difficulties.

Specimens must be packed with repellants as soon as caught. If not, the ants will destroy them within a very few minutes.

To repel the personal pests, Mr. Buchholz uses a set of pockets, made of oilcloth and muslin. These long narrow pockets are fastened about the ankles and waist, oilcloth side in. Some dichlorobenzene is placed in each pocket. Mr. Buchholz finds this more effective than kerosene, etc. There must not be too much dichlorobenzene or the catch will be repelled before it is caught.

The meeting adjourned at 9:50 P.M.

Albro Tilton Gaul,
Secretary pro tem.

Meeting of March 14, 1940

A regular meeting of the Brooklyn Entomological Society was held at the Brooklyn Museum on Thursday evening, March 14, 1940. President William T. Davis presided, and eight other members were present, namely, Messrs. Buchholz, Dietz, Engelhardt, Gaul, Malkin, McElvare, Siepmann and Teale, also Mr. and Mrs. Max Kisliuk, and Messrs. Irving Friedland and Arnold Goldberg.

The minutes of the two previous meetings were read and accepted. A favorable report was presented by the treasurer.

Mr. Engelhardt proposed for membership, Mr. F. Martin Brown, Fountain Valley School, Colorado Springs, Colorado, who was duly elected a member. Mr. Brown formerly lived in New York, and is the author of a paper on Lepidoptera which appeared in a recent number of the BULLETIN.

Mr. Dietz announced the death of Mr. Herman J. Erb on March 12. Mr. Erb was an active collector of Lepidoptera.

Mr. Edwin Way Teale spoke on the subject of "Collecting Insects with a Camera," supplementing his talk with beautiful lantern slides, colored by hand. Mr. Teale briefly reviewed some of the methods employed in the past for photographing insects. David Graham Fairchild, author of the "Book of Monsters" made his own camera with a 24 foot wooden tunnel taking the place of the bellows. To focus this cumbersome camera, it was necessary for the operator to look on the ground glass at one end, while his assistant manipulated the specimen at the other end until it was in focus. L. W. Brownell, of Paterson, N. J., uses a 40 pound 8 × 10 view camera utilizing glass plates. In contrast to these large cameras, James D. Leonard, of New York City, employs a Leica camera, using 35 mm. roll film. But, while the camera itself is of small size, it necessitates an elaborate system of stages, pulleys and levers for manipulating the specimen. His equipment recalls the inventions of "Rube Goldberg."

Mr. Teale then explained the comparative simplicity of his own apparatus, which he brought with him and showed to the members. He also stressed that he took pictures of living insects in natural poses rather than dead museum specimens. This necessitated the use of higher shutter speeds, larger stop openings, and the attendant loss of depth of field. Mr. Teale uses a Zeiss Ideal B camera accommodating $3\frac{1}{4} \times 4\frac{1}{4}$ film packs or cut films. The camera has a double extension bellows and a ground glass is used for focusing. A tripod is necessary for taking closeups, as the depth of field is so shallow, that the least movement of the camera will throw the subject out of focus. Using the double extension bellows, it is possible to take pictures of katydids and large butterflies. To get still closer to his subject, he unscrews the front element of his Zeiss tessar lens. Using only the rear element of the lens, he can take pictures of such insects as ants enlarged almost two diameters. Depth of focus at this magnification is almost as thin as a sheet of paper. To take pictures that are magnified up to ten or twelve diameters, Mr. Teale removes his Zeiss tessar lens, which is attached to his camera with a bayonet lock, and uses a 1-inch Wollensak movie camera lens.

(*Continued in No. 2*)

Vol. XXXVI APRIL, 1941 No. 2

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OF THE

BROOKLYN ENTOMOLOGICAL SOCIETY

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The Brooklyn Entomological Society

Meetings are held on the second Thursday after the first Tuesday of each month from October to June, inclusive, at the Central Museum, Eastern Parkway and Washington Ave., Brooklyn. The annual dues are $2.00.

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BULLETIN

OF THE

BROOKLYN ENTOMOLOGICAL SOCIETY

Vol. XXXVI April, 1941 No. 2

CHARLES W. LENG AND THE BROOKLYN ENTOMOLOGICAL SOCIETY.

By Wm. T. Davis, Staten Island, N. Y.

Chas. W. Leng, Oct. 15, 1914. Photo by Wm. T. Davis.

Charles William Leng, elected Honorary President of the Brooklyn Entomological Society, December 14, 1922, died at his home, 439 Clove Road, Staten Island, January 24, 1941. He was born

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on Staten Island, April 6, 1859, but shortly thereafter the family removed to Brooklyn, Long Island, where they remained until March, 1879, when they returned to Staten Island.

In the February, 1923, number of the Bulletin of the Society the address delivered by Mr. Leng, December 14, 1922, on the occasion of its 50th anniversary, is printed. It is truthfully described on page 174 of the Bulletin for December, 1923, as "delightful," and the writer recommends it to all of those interested in the early history of the Society.

Mr. Leng joined the Society when he was 16, and he describes Graef, Tepper, Fuchs, Luetgens and Schaupp, among the influential members of 1875 and 1876. He was particularly guided by Schaupp from whom he received instruction in the German language, and who had considerable influence in directing his entomological work.

Mr. Leng wrote in 1922: "I began to collect insects fifty years ago, in 1872, the year in which the Society was organized." He tells of organizing the Polytechnic Entomological Society, and of inducing Akhurst, Andrews and Nostrand to attend. Later they were joined by the Rev. George D. Hulst, at whose suggestion the name was changed to the Long Island Entomological Society. In time Schaupp also attended, and gradually the members of the Long Island Society joined the Brooklyn Entomological Society. This was all before the first number of the Bulletin appeared in 1878, and it is of interest that Mr. Leng drew the seal still in use on the cover of the Bulletin, the central figure of *Cicindela schauppi* being supplied by Mr. Schaupp.

In January, 1885, the Brooklyn Entomological Society was incorporated, and we find Mr. Leng one of the six incorporators. He long survived Messrs. Graef, Hulst, Smith, Neumoegen and Roberts, as well as the notary public Mr. Weeks, who was also a member of the Society.

In 1885, the Bulletin of the Brooklyn Entomological Society ceased publication, but the Proceedings of the Society appeared in Entomologica Americana, that commenced publication in April of that year, and we find Mr. Leng serving as Curator of the Society. Also he continued the publication of his Synopsis of the Cerambycidae, commenced in the Bulletin in May, 1884, and continued in Entomologica Americana from 1885 to 1890, when that publication was discontinued for a time. The paper was finally brought to a close in 1896 in the Transactions of the American Entomological Society by the publication of the Lamiinae, of which Leng and Dr. John Hamilton were co-authors.

Six volumes of Entomologica Americana were published from 1885 to 1890, and then it likewise was discontinued to be resumed in 1926, after a lapse of 36 years.

On May 1, 1888, the matter of the Brooklyn Entomological Society becoming a Section of the Brooklyn Institute was discussed, and at the meeting of December 4, 1888, it was announced that the details had been agreed upon. On January 7, 1890, it was announced that: "The election of officers was postponed until the first meeting in May to correspond with other departments of the Institute." While joining the Institute as a section, the Entomological Society made it plain that it was to retain its corporate existence.

In 1895, volume 6, page 165, of Entomological News, there is a notice of the April 2, 1895, meeting of the Brooklyn Entomological Society, held in the Art Rooms in Montague Street, Brooklyn. No further notice of the meetings of the Brooklyn Society appear in the News until 1902, vol. 13, when we read of the meetings held at the home of Mr. George Franck, 1040 DeKalb Avenue, December 6, 1900, and in January, February and March, 1901. The records of the meetings of 1901 were continued in volume 15, 1904, of the News, and from then on to the end of volume 20 (1909), the proceedings of the Society are recorded. On February 2, 1905, Mr. Leng acted as Chairman in the absence of the President. In 1906 the meetings commenced to be held at 55 Stuyvesant Avenue, which had become the home and place of business of Mr. Franck, dealer in insects and entomological supplies. Gradually the records of the meetings in the News became fewer and fewer, and in volumes 21 (1910), 22 (1911) and 23 (1912) but four meetings are recorded.

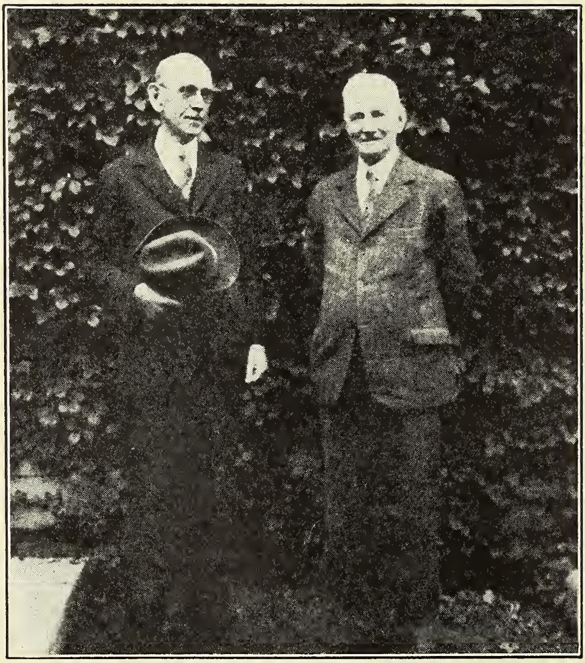
During the years when the Society met at the home of Mr. Franck we find the re-election of some of the earlier members, as for instance at the meeting of November 17, 1904, when Charles W. Leng and William T. Davis were elected.

It was in October, 1912, that the Society commenced the republication of its Bulletin, discontinued in 1885, and from that time on the records of the meetings have appeared.

"The Rhynchophora or Weevils of North America," by W. S. Blatchley and C. W. Leng, was published in 1916, and, immediately became an authoritative book on these insects. It gave descriptions of nearly 1,100 species, with numerous illustrations.

In 1920 appeared Mr. Leng's great work, the: "Catalogue of the Coleoptera of America, North of Mexico," which listed over 18,000 named forms, citing the original description of each species, and giving in a general way its known distribution. This monumental work also includes an Essay on Classification, as well as a: "Bibliography of Taxonomic Coleopterology (to January 1st, 1919)." From the bibliography we learn that Mr. Leng published to January, 1919, 141 notes and papers on Coleoptera, including appreciative notices in memory of some departed entomologists. In 1884 he printed a note in the Proceedings of the Natural Science Association of Staten Island on the Cincindelidae of Staten Island, and his Synopsis of the Cerambycidae was commenced in the same year in the Bulletin. These are recorded as his earliest contributions to Coleopterology.

At the meeting of November 12, 1936, the Fiftieth Anniversary of the incorporation of the Brooklyn Entomological Society was commemorated, and Mr. Leng, Honorary President, and the only survivor of the six incorporators of 1885, recalled his memories of the early members of the Society. He also mentions the hospitality



E. P. Van Duzee and Chas. W. Leng at Staten Island Museum, Sept. 7, 1928.

of Mr. Franck as an aid in keeping the Society together, and to its resumption of activity after a period of dormancy.

The 1936 certificate of incorporation of the Brooklyn Entomological Society was filed in Albany on February 10, and as in 1885 Mr. Leng was one of the incorporators. The others were William T. Davis, Ernest Shoemaker, George P. Engelhardt and Carl George Siepmann. The original certificate was deposited with the New York Historical Society for safe keeping, as recorded in the Bulletin for February, 1937, vol. 32, page 37.

The resolution adopted by the Society at its meeting of February 13 has appeared in the February issue of the Bulletin, and expresses the feeling of sorrow and regret that we feel at the passing of our genial, helpful and learned friend, who ever had in mind the welfare of our Society.

An Unrecorded Sleeping Habit of Dolichovespula arenaria, Fab. (Hymenoptera, Vespidae).—Colonies of *Dolichovespula arenaria* Fab. were maintained in observation hives during the summer of 1939 at Lakeville, Conn.

During the hot, dry nights of late August, I noticed that a number of *arenaria* workers had abandoned their custom of sleeping within the nest. They were sleeping in the hive, and on the nest envelope. Further observations afield, at night, disclosed the fact that workers in other colonies of *arenaria* were similarly sleeping on the nest envelope. In both the hives, and in the field this practice was continued until the new brood of queens and males emerged. During this period, hived and free colonies of *Dolichovespula maculata* Lin. slept entirely within their nests.

On several occasions, I gently struck the *arenaria* nest envelope; whereupon a number of other workers would issue from the nest. This indicated that the whole ergate population did not sleep outside. Those individuals who did sleep outside never entered the nest when disturbed.

The weather was uniformly dry and warm, and I could not determine the part it played in this habit.

The *arenaria* nests are rather small and the large space occupied by the queen pupae might render the quarters somewhat cramped by accommodating the full complement of workers. It may well be that some of the workers sleep outside where it is more comfortable. —ALBRO TILTON GAUL, Brooklyn, N. Y.

NEW HETEROPOGON WITH A KEY TO THE SPECIES (DIPTERA, ASILIDAE).

By J. Wilcox, Alhambra, California.[1]

Two species of *Heteropogon* from Arizona are described as new and a description of the female of *Heteropogon vespoides* (Bigot) is given. *Pycnopogon cirrhatus* Osten Sacken is included in the key to the species, as is also *H. johnsoni* Back which, in the writer's opinion, is a more typical *Pyconopogon* than *cirrhatus;* in fact, there are no good characters for separating these two genera if the American species can be considered as examples. Two species, *H. phoenicurus* Loew and *H. rubrifasciatus* Bromley, have not been seen, so it has been necessary to rely on the descriptions for placing them in the key, a procedure which usually does not prove satisfactory.

Key to the Species of Heteropogon.[2]

1. Abdomen dorsally with at least posterior one-third of segments clothed with longer recumbent light hairs (*Pycnopogon* Loew) 2
   Abdomen dorsally with very short, inconspicuous hairs (*Heteropogon* Loew) 3
2. Basal half or two-thirds of abdominal segments black haired, apically yellowish white haired; middle tibiae of the males without brush of black hairs and bristles; length 10–15 mm. (Colo., Ariz., N. Mex., Tex.) . . . . . *johnsoni* Back
   Abdomen golden haired, only anterior angles black haired; middle tibiae of males with a brush of black hairs and bristles; length 8–12 mm. (Calif., Oreg., Wash., Nebr.). *cirrhatus* Osten Sacken
3. Scutellum with fine hair, marginal bristles present or absent. 4
   Scutellum not finely haired, marginal bristles present 14
4. Scutellum without marginal bristles 5
   Scutellum with marginal bristles 7

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[1] The writer is especially indebted to Mr. D. K. Duncan of Globe, Ariz., who collected most of the specimens of the new species described and who has supplied many additional new species from Arizona.

[2] *Heteropogon nigripes* Jones is not included, as it apparently belongs in the genus *Eucyrtopogon* Curran. Its entirely black legs will separate it from the species of *Heteropogon* and *Pycnopogon.*

5. Abdomen largely black; wings with small brown clouds on cross veins and furcations; male genitalia very large; length 10–12 mm. (Colo., Utah, Mont., Ariz.). *maculinervis* James

   Abdomen largely reddish; wings more extensively brownish. 6

6. Femora black; style $1\frac{1}{4}$ times as long as third antennal joint; scutellum with only a few marginal hairs; front metatarsi of male with dense appressed white hairs above; length 10–16 mm. (Tex.) . . . . *patruelis* Coquillett

   Femora reddish, dorsum usually black; style two-thirds as long as third antennal joint; scutellum with quite abundant marginal and discal hairs; front male metatarsi without dense hairs above; length 14–17 mm. (Calif., Ariz.). *rubida* Coquillett[3]

7. Femora below reddish; very large species; abdomen largely yellow pollinose; length 24–25 mm. (Calif.). *vespoides* Bigot

   Femora black; smaller species, 18 mm. or less in length 8

8. Wings largely brown or with definite brown clouds on cross veins and furcations 9

   Wings hyaline, sometimes with a yellowish clouding around anterior cross vein 10

9. Basal half of wings, except extreme base, hyaline, apex black; style longer than third antennal joint; mesonotum white or yellowish pollinose; length 9–12 mm. (Tex.). *phoenicurus* Loew

   Wings hyaline with small brown clouds on cross veins and furcations; style shorter than third antennal joint; mesonotum brown pollinose; length 10–14 mm. (Okla.). *currani* Pritchard

10. Abdomen entirely bare of pollen 11

    At least hind angles of abdominal segments pollinose 12

11. Laterally anterior half of abdominal segments with rather long black hairs; mesonotum largely brown pollinose; mesonotal and tibial bristles black; length 10–18 mm. (Calif., Oreg., Wash., B. C.) . . . . *ludius* Coquillett

    Hairs on sides and short dorsal hairs on abdomen largely white; mesonotum largely gray and yellowish pollinose; mesonotal and tibial bristles largely white; length 13 mm. (Calif., Oreg.) . . . . *senilis* Bigot

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[3] The type specimen from Los Angeles County, Calif., in the U. S. National Museum has marginal scutellar bristles.

12. Entire male abdomen and segments 1–5 of female abdomen pollinose; bristles white except some or those on the tarsi, which are black; length 12–16 mm. (Colo., N. Mex.). *wilcoxi* James

At most posterior margins of abdominal segments pollinose, bristles black 13

13. Only hind angles of abdominal segments pollinose posteriorly; style subequal in length to the third antennal joint; length 11–16 mm. (Ariz., Utah) . . . . **arizonensis,** n. sp.

Entire posterior margins of most of abdominal segments pollinose; style 1 1/3 times as long as third antennal joint; length 9–12 mm. (Tex.) . . . . *lautus* Loew

14. Scutellum apically shining black 15

Scutellum entirely pollinose 17

15. Style longer than third antennal joint; male abdomen spatulate; abdomen of both sexes largely yellowish; length 10–11 mm. (Ariz.) . . . . *spatulatus* Pritchard

Style shorter than third antennal joint; male abdomen not spatulate; abdomen of both sexes largely black 16

16. Femora black; wings hyaline, clouded on the cross veins and furcations; male fore metatarsi with dense white hairs dorsally and externally; length 8–9 mm. (Ariz.). *paurosomus* Pritchard

Hind femora, and usually middle ones below, reddish; wings dark brown, anal and basal cells lighter; male fore metatarsi with very short recumbent white pile; length 8–10 mm. (Ariz.) . . . . **duncani,** n. sp.

17. Female abdomen black; male middle tibiae with brushes of black hairs; length 10–12 mm. (N. J., N. Y., Pa., Ky.) *macerinus* Walker

Segments 2–6 of female abdomen posteriorly and seventh segment entirely reddish; male middle tibiae without brushes of black hairs; length 10–15 mm. (N. C.). *rubrifasciatus* Bromley

Heteropogon vespoides (Bigot).

Anisopogon vespoides Bigot, Annales, 423, 1878.

Heteropogon vespoides Back, Trans. Amer. Ent. Soc. XXXV: 329, 1909.

This species was described from a single male specimen collected in California and apparently has not been recognized since. A specimen believed to be the female is described below.

Female: Length 25 mm. Head black in ground color (greased so that the color of the pollen cannot be determined); hairs and bristles whitish, the hairs below antennae and on front, and 6 bristles on either side of ocellar tubercle, brownish. First two antennal joints and apical two-thirds of third joint reddish, base of third joint and the style black; first two joints subequal in length, both brown haired, second joint with two short brown bristles below; third joint 1 1/3 times as long as first two joints together, of nearly uniform width, slightly wider at middle and gradually narrowing at apex; style half as long as third joint.

Mesonotum black (greased), the humeri, lateral margins, and postalar calli reddish. Hairs brown, bristly, a lateral tuft behind humeri and those on postalar calli fine, whitish. Bristles brown, 3–4 short humeral, 3–4 presutural, 8–9 supra-alar, and 4–5 postalar. Scutellum black (greased) with fine whitish discal hairs and about 10 brown marginal bristles. Pleura and coxae (greased) largely reddish, sternopleura below black; hairs and bristles yellowish white.

Abdomen (greased) largely black, sides of segments 2–5 and segments 6–8 largely reddish; segments 1–6 apparently largely covered with dense pollen, narrow anterior margin of segment 2 and broad anterior corners of segments 2–5 shining, bare of pollen. Hairs entirely yellowish white, long on sides of segments 1–2; apical spines brown.

The dorsal half of femora, tibiae narrowly dorsally, black, remainder of legs reddish; hairs entirely yellowish white; bristles entirely yellowish to brownish; claws black, bases reddish; pulvilli yellowish. Metatarsi of fore and middle legs subequal, and of hind legs equal, in length to joints 2–4 together.

Halteres reddish brown. Wings tinged with light brown, more intense along veins; veins reddish brown, anterior crossvein at five-ninths distance from base to apex of discal cell.

Described from a specimen with the following data: Paraiso Springs, Monterey County, Calif., IX–2 '24 (L. S. Slevin), in the collection of the California Academy of Sciences.

The yellow face and scutellum and the yellow areas on the mesonotum and abdomen referred to by Bigot must apply to the color of the pollen, which is greased on this specimen.

Heteropogon duncani, new species.

Male: Length 8 mm. Head grayish white pollinose; palpi, proboscis, and vertex black. Hairs white, on palpi black; bristles of mystax yellowish (1 on oral margin black), sparse, upper two at about two-thirds height of face; four yellowish bristles on ocellar tubercle and about half of occipital bristles yellowish, remainder black. First and second antennal joints subequal in length, first joint black and white haired, second joint black haired and with a strong yellowish bristle below; third joint 1¼ times as long as first two joints together; style two-thirds as long as third joint.

Anterior third of mesonotum including humeri densely whitish pollinose, broad central stripe somewhat darker, remainder brownish pollinose. Sparse hairs anteriorly white, those posteriorly black; 2–3 black humeral bristles, 4–5 yellowish presutural, 2 black supra-alar, 2–3 yellow postalar, and 1–2 yellow posterior dorsocentral. Basal half of scutellum gray pollinose, apical half black, bare of hairs but with a pair of yellowish marginal bristles. Pleura and coxae gray pollinose and white pilose.

Abdomen largely bluish black, posterior corners of segments 3–4, narrow posterior margin of segment 5, apical half and sides of segment 6, and segment 7 entirely, yellowish red; sides of first segment and small posterior corners of segments 2–5 gray pollinose; hairs on lateral margins fine, white, rather long on segments 1–4; above these on the sides of the segments are rather numerous, short, black and yellow spines; dorsally with short, sparse, recumbent black hairs on the black areas, those on the yellowish areas yellow; first segment with 2–3 white lateral bristles. Genitalia reddish brown and short yellowish and brown haired, hypandrium with a narrow apical fringe of dense, quite long, black hairs.

Femora black, fore femora below at apex, middle femora below at base and apex, and entire venter of hind femora reddish; tibiae and tarsi reddish, last joint of tarsi black; claws black; pulvilli dark brown. Hairs of femora and tibiae largely white, of tarsi largely black, fore metatarsi with sparse white hairs above and posteriorly; bristles of femora white, of tibiae largely white, and of tarsi largely black. Middle femora and tibiae without brush of black hairs.

Halteres yellowish, base brown. Wings brown, anal and basal cells lighter; veins dark brown, anterior crossvein at three-fifths distance from base to apex of discal cell.

Female: Length 9 mm. Similar. All but one of occipital bristles yellowish. Median blackish-brown stripe of mesonotum more evident anteriorly. Abdomen as in male except that broad sides of segments 6–7 are reddish, segment 8 and apical spines black. Bristles of femora and tibiae and about half of those of tarsi white.

Holotype: Male, Baboquivari Mts., Ariz., April (D. K. Duncan), in the writer's collection.

Allotype: Female, with same data, in the writer's collection.

Paratypes: 78 specimens with the same data and Santa Catalina Mts., Ariz., April (Duncan), in the writer's and D. K. Duncan's collections, and 4 specimens, type locality, IV–28 '35 (F. H. Parker) in F. H. Parker's collection.

Very similar to *paurosomus* Pritchard, but differing in that the bristles of the mystax extend higher up on the face, the white hairs of the mesonotum are very sparse (the white hairs are very dense in *paurosomus,* especially anteriorly), the yellowish hairs and the dorsal black hairs of the abdomen are more abundant, the hind femora are reddish below, the white hairs of the fore metatarsi and the black hairs on their outer joints are short (in *paurosomus* the white hairs and the black hairs of the outer joints form a dense posterior fringe about equal in length to the diameter of the segments), and the brown of the wings is more extensive. Mr. A. Earl Pritchard has very kindly loaned the writer paratypes of *paurosomus.*

Heteropogon arizonensis, new species.

Male: Length 12 mm. Head grayish white pollinose, palpi and proboscis black. Hairs fine, white, those of the palpi black. Bristles on oral margin and upper 8–10 occipital bristles, black; remainder of occipital bristles and four on ocellar tubercle white. First two antennal joints subequal in length and white haired, second joint with a black bristle below; third joint 1 2/3 times length of first two joints together, style subequal in length to third joint.

Mesonotum thinly gray pollinose, subshining brown, transverse suture and lateral margins more densely gray pollinose. Hairs white, bristles largely black, 1–2 short humeral, 4 presutural, 4 supra-alar, and 4 postalar (white). Scutellum grayish pollinose and fine white haired, four black marginal bristles. Pleura and coxae gray pollinose and white haired.

Abdomen black, sides of first segment, posterior corners of segments 2–4, and narrow anterior margins of segments 2–5, gray pollinose. Hairs on sides of segments white, long on sides of segments 1–4, dorsally with short, recumbent, black hairs, 4–5 white lateral bristles on first segment. Genitalia black, reddish brown apically, sparsely white haired, hypandrium apically with a dense fringe of yellowish white bristles.

Femora black, tibiae and tarsi reddish; hairs largely white, bristles largely black; fore metatarsi dorsally and posteriorly with rather dense white hairs; middle femora and tibiae with usual brush of black hairs.

Halteres yellowish. Wings clear hyaline, veins dark brown, anterior crossvein at about two-thirds distance from base to apex of distal cell.

Female: Length 11 mm. Similar. Bristles on ocellar tubercle black. Mesonotum largely golden brown pollinose, suture and lateral margins grayish pollinose. Sides of abdominal segments 1–4 and anterior margins of segments 2–4 gray pollinose; segments 5–8 shining black, apical spines black. Fore metatarsi with very sparse, short, white hairs; middle femora and tibiae without brushes of black hairs; tibial bristles largely white.

Holotype: Male, White Mts., Ariz., September (D. K. Duncan), in the writer's collection.

Allotype: Female, with the same data, in the writer's collection.

Paratypes: 37 specimens of both sexes with the same data, in the writer's and D. K. Duncan's collections; and male, Oak City, Utah, VI–25 '35 (G. J. Sorenson), in Dr. S. W. Bromley's collection.

Note on the Occurrence of Oeneis macouni.—I first learned about the occurrence of *Oeneis macouni* Edw. in Michigan from an article in Entomological News in 1939 (pp. 192–194). Mr. R. N. Rysgaard, of the University of Michigan, has given the Isle Royale specimen to the Museum of Zoology of the University. He wrote me: "The specimen of *macouni* was taken on Birch Island, Amygdaloid Channel, Isle Royale, on June 29, 1934. The area was upland woods in which there are paper birch, small Norway and white pine, and a few other hardwoods. There were frequent open areas among the trees."—W. W. Newcomb, Ann Arbor, Mich.

STUDIES ON THE PLECOPTERA OF NORTH AMERICA, II*

By John F. Hanson, Amherst, Massachusetts.

In the course of my studies on stoneflies two new species of *Leuctra* and a new *Megaleuctra* have come to my attention. Also, close examination of almost all of the North American species of *Leuctra* has led me to the conclusion that in the present genus *Leuctra* is a group of species which are even more closely allied to *Perlomyia* than to *Leuctra* itself. For this reason I am here proposing the name *Paraleuctra* as a genus encompassing seven North American stoneflies until now placed in the genus *Leuctra.* Because of incomplete accounts in the literature I have not been able definitely to determine the status of *Paraleuctra* as regards one or two European genera or subgenera. Also, due to the current war or some other unknown difficulty, I have not received answers from correspondence with European workers who probably have specimens of species in these genera or subgenera. Thus there is a possibility that *Paraleuctra* may fall into synonymy. However, I think it better to give this new grouping proper emphasis at this time than to wait indefinitely for the study of some specimens that may never be available.

Genus **Paraleuctra** novum

Figs. 2, 5.

No crossvein beyond the tip of the subcosta; Rs and M of fore wing originate at separate points on the radius; m-cu of hind wing joins upper branch of Cu_1 near its base. Pronotum elongate. Prothoracic furcasternum consisting of a single sclerite which is united with the posterior end of the basisternum; prothoracic presternum partially separated from basisternum. Laterosternite and lateropleurite of meso- and metathorax joined for their entire length and the suture between them only poorly demarked posteriorly. Cerci variously modified in male.

Genotype: *Paraleuctra occidentalis* (Banks)

Leuctra Stephens

Figs. 3, 6.

No crossveins beyond the tip of the subcosta; Rs and M of fore wing originate at separate points on the radius; m-cu of hind wing joins Cu_1 before its dichotomy. Anal fan of hind wing slightly larger than that of the genus *Leuctra*. Pronotum transverse. Prothoracic furcasternum usually of two distinct sclerites which are separate from the basisternum; presternum shows no trace of separation from the basisternum. Meso- and metathoracic laterosternite and lateropleurite are not completely joined anteriorly and the suture between them is distinct for its entire length. Cerci unmodified in male.

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* Contribution from the Department of Entomology, Massachusetts State College, Amherst, Massachusetts.

According to this new grouping the North American species of *Leuctra*, including the two described in this paper, fall readily into the genera *Leuctra* and *Paraleuctra* in the following manner.

Leuctra Stephens

augusta Banks
biloba Clsn.
carolinensis Clsn.
crosbyi Clsn.
decepta Clsn.
duplicata Clsn.
ferruginea Walker
glabra Clsn.
grandis Banks
hamula Clsn.
infuscata Clsn.
monticola n. sp.
sibleyi Clsn.
tenuis (Pictet)
triloba Clsn.
truncata Clsn.
variabilis n. sp.

Paraleuctra n. g.

bilobata (Clsn.)
bradleyi (Clsn.)
claasseni (Frison)
forcipata (Frison)
occidentalis (Banks)
purcellana (Neave)
sara (Clsn.)

Leuctra, Rhopalopsole, Perlomyia, Megaleuctra, and *Udamocercia* though widely distributed over the earth form a close-knit group of genera. The genus *Leuctra* is distinctly set off from all the others in the union of m-cu and Cu_1 before the forking of Cu_1, lack of any trace of separation of prothoracic presternum from basisternum, only partial fusion of pleuron with sternum in meso- and metathorax, and presence of titillators in the male. The genitalia in the genus *Leuctra* are so different from those of the other groups that their parts cannot be homologized. Yet, in all the other groups the homologies of the genitalic parts are evident, thus indicating a closer relationship between *Paraleuctra* and other genera than between *Paraleuctra* and *Leuctra*. This relationship is further indicated by the fact that one species of *Paraleuctra, P. claasseni* has its prothoracic presternum completely separated from the basisternum as it is in *Perlomyia, Rhopalopsole,* and *Megaleuctra.* In fact, every character of the entire body of the species here split off as *Paraleuctra,* except the one character which has been used to group these insects with *Leuctra,* indicates that *Paraleuctra* is closer to the other genera here considered than to *Leuctra.* An abnormal specimen of *Paraleuctra sara* (Clsn.) taken by the author in Amherst exhibits the tendency toward fusion of Rs and M that is found in *Perlomyia.* In both fore wings of this specimen Rs and M are fused for a considerable distance and would require the erection of at least a new subgenus were not the identity of the species known.

A key to the genera of Nemouridae which lack a crossvein in the cell beyond the tip of the subcosta is included below. Only six genera of the group are known to the author; four of these are found in North America.

KEY TO NEMOURIDAE.

1. Vein m-cu of hind wing joins Cu_1 before its forking. Prothoracic presternum shows no trace of separation from basisternum; prothoracic furcasternum consists of two separate sclerites; titillators usually present and cerci unmodified in male. Most abdominal tergites of female without trace of sclerotization . . . . *Leuctra*

Vein m-cu of hind wing joins upper branch of Cu_1. Prothoracic presternum partly or completely separated from basisternum; prothoracic furcasternum consists of a single sclerite; titillators absent and cerci modified into accessory copulatory hooks in male. All abdominal tergites of female having some sclerotization 2

2. Rs and M of fore wing originate from a common point on R; prothoracic presternum completely separated from basisternum . . . . *Perlomyia*

Rs and M of fore wing originate from separate points on R . . . 3

3. Anal fan of hind wing very small. Presternum completely separated from basisternum . . . . *Rhopalopsole*

Anal fan of hind wing large 4

4. Body size small (7 to 9 mm.) Presternum only partly separated from basisternum (except in *P. claasseni* in which it is completely separated) . . . . *Paraleuctra*

Body size large (15 to 17 mm.) Presternum completely separated from basisternum ..... *Udamocercia?, Megaleuctra*

Since I have never seen an authentic specimen of *Udamocercia,* the position of this genus in the above key is somewhat in doubt.

The immature forms of only two of the genera here treated (*Leuctra* and *Paraleuctra*) are known to me. The following key will serve to separate these genera.

KEY.

Labial palpi extending far beyond the paraglossae .... *Leuctra*

Labial palpi extending only as far as or infrequently very slightly beyond the tip of the paraglossae .... *Paraleuctra*

In Claassen's key (1931) the naiad of *Paraleuctra* runs directly to Capniidae on all three characters there mentioned but it can easily be distinguished by the long narrow wing pads characteristic of *Paraleuctra* and *Leuctra.*

TYPES OF IMMATURE STAGES

The only terms known to the author for the designation of types of immature stages of insects are *nepionotype* for the type of a larva and *neanotype* for the type of a pupa, both proposed by Dr. C. P. Alexander in Part II of "The Crane-flies of New York" (Cornell Univ. Agr. Exp. Sta., Memoir 38: 743–744. 1920). As used by Dr. Alexander *nepionotype* is here considered as the first designated type specimen (larva, naiad, nymph, or exuviae) of either sex. In the preparation of this present paper two additional terms (allonepionotype and paranepionotype) for the designation of larval types has seemed necessary and are proposed. *Allonepionotype* is the type specimen of the opposite sex to that of the nepionotype, not necessarily of the original type series, chosen either by the original author or by any subsequent student. *Paranepionotypes* are specimens belonging to the original type series remaining after the nepionotype (and allonepionotype) have been selected.

TAXONOMIC CHARACTERS

A thorough study of the external structures of *Leuctra* seems to show that taxonomists have neglected no characters that are of use in distinguishing species of *Leuctra* in the adult stage. Several supplementary specific characters that are misleading and not dependable are in use. The shape of the supraanal plate has been used extensively and although it exhibits reliable specific differences in many cases, it is a difficult structure to use, since it is only weakly sclerotized and therefore is easily misshapen. Body length is too variable to be of value in specific distinctions; with *L. grandis* the large size of many specimens is, however, an indication of identity. The number of intercubitals beyond m-cu is too variable to be of any use whatsoever. The distance between the lateral ocelli and the distance of either lateral ocellus from the compound eyes varies so slightly that it can be used only with difficulty if at all as a character for species distinction; the apparently great differences in position of ocelli in descriptions given by Needham and Claassen do not seem to exist. It is therefore evident that almost without exception only the terminalia offer reliable specific characters.

A detailed account of general morphological details being superfluous in view of the above discussion, it is omitted in the following descriptions.

Leuctra monticola n. sp. Figs. 4, 8.

> Similar in general details to other species of the genus *Leuctra*. Length to tip of wings, 6 to 7 mm. in male, 7 to 8 mm. in female; length of body, 4 to 5 mm. in male, 4 to 6 mm. in female.
>
> Male: Prolongation of the eighth tergite broad (about one-half the width of the segment), bilobed, and extending to posterior margin of the eighth segment; each lobe broadly and obliquely truncated. Ventral lobe of ninth sternite twice as long as wide, club-shaped, very narrow at base. Ninth sternite ending posteriorly in a lobe which is about one-third to one-fourth the width of the segment, broadly rounded at tip, and about as wide as long. Subanal lobes, in lateral view, angulate near base and narrowing slightly apically, very narrow in dorsal or ventral view. Titillators rather broad at base, gradually narrowed to a sharp point, extending nearly to tip of subanal lobes, gently curved upward.
>
> Female: Subgenital plate narrowed slightly posteriorly, with a broad median notch dividing its apex into two rounded or subtruncate lobes. Each lobe has a dark brown rim along its outer margin.

Holotype, male.—Cades Cove, Great Smoky Mts., Tennessee, April 24, 1938 (Inez W. Williams). Allotopotype, female. Paratopotypes.—23 males, 32 females.

The bilobed process of the eighth tergite of this species is much larger and differently shaped than that of the holotype of *L. biloba*. Also in lateral view the lower margin of the subanal lobes is angulate near the base in *L. monticola* and not evenly rounded throughout its length as in *L. biloba*.

Leuctra variabilis n. sp. Figs. 3, 7, 9, 11, 15.

The body, like that of all other species of *Leuctra,* is uniformly dark brown except for slightly darker rugosities of pronotum and occiput of head. The mouthparts, wings, legs, and thoracic sclerites are typical of *Leuctra.* Length to tip of wings, 7 to 8 mm. in male, 7 to 9 mm. in female; length of body, 5 to 6 mm. in male, 6 to 8 mm. in female.

Male: A broad median prolongation extends upward and backward from the middle of the seventh tergite to the posterior border of the segment. This projection is usually truncate at the tip but is occasionally rounded or trilobed and may bear sharp lateral projections at its apex as well. The rest of the seventh tergite and the whole of the eighth tergite are membranous. The ventral lobe of the ninth sternite about as wide as long, broadly rounded at tip. Ninth sternite bearing a small triangular lobe posteriorly. Subanal lobes in lateral view not very broad but broader than those of *L. decepta* and tapering gradually to a blunt apex, curved slightly upward. Titillators a little shorter than subanal lobes, very slender and sharply pointed, curved upward slightly at a point half way between base and apex and also at a point very near the tip.

Female: Subgenital plate divided by a deep narrow emargination into two obliquely truncated lobes which converge mesally at their tips, hairy, color variable.

Naiad: Color uniformly light brown; exuviae practically colorless. General morphological details similar to those of other known naiads of the genus *Leuctra.* Length of body 7 to 8 mm. Each segment of antennae and cerci with an apical whorl of sparse short setae. Abdominal setae sparsely and irregularly distributed, more numerous toward apex of abdomen; last three or four segments with an apical marginal row of short setae. Subanal lobes slightly modified, having a broadly curving preapical row of setae beyond which a less sclerotized apex bears a few short setae and two remarkably long and thin setae. Sexes not distinguishable except in mature naiads where adult genitalia can be seen within the naiad exoskeleton.

Holotype, male.—Paradise Trail, Sunderland, Mass., Nov. 24, 1937 (Hanson). Allotopotype, female. Paratopotypes.—26 males, 28 females, Oct. 3, 1937 (Bartlett and Hanson); 1 male, 1 female reared, Oct. 3, 1937 (Hanson); 4 males, 1 female reared, Oct. 4, 1937 (Hanson); 2 males, 1 female reared, Oct. 6, 1937 (Hanson); 37 males, 13 females, Oct. 11, 1937 (Hanson); 28 males, 31 females, Oct. 21, 1937 (Bartlett and Hanson); 2 females, Nov. 7, 1937 (Hanson); 8 males, 10 females, Nov. 7, 1937 (Hanson); 4 males, 1 female, Nov. 24, 1937 (Hanson); 4 males, 7 females, Oct. 12, 1938 (Nutting); 2 males, Nov. 24, 1939 (Hanson). Paratypes.—Dover, Mass., 1 female, Oct. 15, 1915; 1 male, Oct. 18, 1915 (N. Banks). Fish Hatchery, Sunderland, Mass., 6 males, 7 females, Oct. 12, 1937 (Hanson); 7 males, 4 females, Nov. 6, 1937 (Hanson). Jacksonville, Vt., 4 males, 2 females. Sept. 3, 1937 (Pratt); 57 males, 68 females, Sept. 12, 1937 (Hanson); 3 males, 11 females, Oct. 31, 1937 (Hanson). Tuckerman's Ravine, White Mts., N. H., 1 male, Aug. 28, 1938 (Alexander). Lakes of the Clouds, Mt. Wash., N. H., 7 males, 9 females, Aug. 28, 1938 (Alexander). Dolly Copp Camp, Mt. Wash., N. H., 1 male, 1 female, Aug. 31, 1938 (Alexander). Nepionotype, male.—Paradise Trail, Sunderland, Mass., Oct. 4, 1937 reared (Hanson). Alleonepionotype, female.—with nepionotype. Paranepionotypes.—Paradise Trail, Sunderland, Mass., 51 specimens, Oct. 3, 1937 (Hanson). The exuviae of the eight reared paranepionotypes are in separate vials (6 males, 2 females) of alcohol with the adults which were reared from them (see data above).

Leuctra variabilis is most closely allied to *L. carolinensis, L. triloba,* and *L. crosbyi.* The adult differs from these in the process of the seventh abdominal tergite and in the terminalia. The infrequent specimens of *L. variabilis* that do have a trilobed process can be distinguished from *L. triloba* by the absence of spines on the apices of their subanal lobes and by difference in curvature of titillators, and from *L. crosbyi* by the shape of the process of the seventh abdominal tergite. The female of *L. variabilis* differs from other females of *Leuctra* in that the lobes of its subgenital plate usually converge slightly at their apices.

Not having seen the other two known naiads of *Leuctra* I am unable to distinguish these species from *L. variabilis.* However, the subanallobes present some specializations which may prove very useful in solving the problem of differentiating the naiads of *Leuctra.*

Paraleuctra sara (Claassen). Figs. 12, 13, 14.

Male naiad: Color uniformly light brown; exuviae practically colorless, shiny and almost entirely glabrous; two or four very delicate setae present on each abdominal segment and also a few setae on the legs. Length of body 8 to 10 mm. General morphological details similar to those of *Leuctra*. Labial palpi short, extending about to tip of paraglossae; segments successively slightly longer from first to third, second widest, third bluntly rounded at tip. Antennae with whorl of short setae and cerci with whorl of long setae at distal end of each segment. Subanal lobes unmodified, glabrous, shiny.

Female naiad: Identical with male except that subanal lobes of male are slightly shorter and broader than in female.

Nepionotype, male.—Paradise Trail, Sunderland, Mass., March 31, 1939 (Hanson). Allonepionotype, female.—Paradise Trail, Sunderland, Mass., April 2, 1938 reared (Hanson); Paranepionotypes.—Paradise Trail, Sunderland, Mass., 4 males, 5 females, March 31, 1939 (Hanson); 5 males, 1 female, April 2, 1938 (Hanson). Pelham, Mass., 1 male, April 15, 1938 (Hanson).

The naiad of this species can be distinguished from the only other naiad yet described in this genus by absence of a row of setae around the distal margin of each abdominal segment.

The following description is of a remarkable new species of *Megaleuctra* collected by Dr. Inez W. Williams in the Great Smoky Mountains of Tennessee. I am pleased to name this interesting new insect after its collector.

Megaleuctra williamsae n. sp. Figs. 1, 10.

General color light brown. Antennae, palpi, labrum, and ninth abdominal sternite brown. Legs yellowish brown except distal part of femur, proximal part of tibia, and the last tarsal segment. Length to tip of wings 16 mm., to tip of abdomen 13 mm.

Head slightly wider than prothorax. Ocelli forming an almost equilateral triangle; lateral ocelli about three diameters distant from compound eyes. Occiput not rugose. Coronal suture absent; postfrontals indistinct. Antennae 70-segmented, 14 mm. long. Maxillae practically identical with those of *Leuctra*. Last segment of labial palpi considerably larger than the other two segments.

Pronotum slightly elongate, not rugose. Presternum of prothorax completely separate from basisternum; furcasternum consisting of a single sclerite. Wing venation as shown in fig. 1; most of the marginal cell beyond tip of Sc darkly infumated.

Abdominal segments except those of terminalia unmodified. A tremendously long narrow cylindrical subanal probe arising from a bulbous base curves downward and then upward again, its tip lying between two processes of the tenth tergite. Processes of the tenth tergite flattened laterally, projecting dorsalward; in lateral view tapering gradually to a rounded apex and bearing a tiny, sharp, subterminal point posteriorly. Ninth sternite completely sclerotized, with a broad posterior lobe widely emarginate at apex and abruptly bent downward at base by pressure of the abutting subanal probe. Ventral lobe large, not flattened dorsoventrally as it is in *Leuctra*.

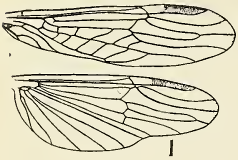
Holotype, male.—Greenbriar Cove, Great Smoky Mts., Tennessee, May 15, 1938 (Williams).

This new species differs markedly from *M. stigmata* (Bks.) in terminalia, especially in its long subanal probe and absence of protuberances on the ninth abdominal tergite.

It might be well to note here a few discrepancies in the figures of *M. stigmata* given in the Needham and Claassen monograph (1925). The holotype male of *M. stigmata* has at the bases of the two prominent knobs on the ninth tergite two clubshaped setiferous projections which extend mesally backwards. Also the ventral lobe of the ninth sternite arises from the base of the segment and is longer than shown in their figure.

Explanation of Plate

Fig. 1. *Megaleuctra williamsae* n. sp., fore and hind wings.
2. *Paraleuctra sara* (Clsn.), fore and hind wings.
3. *Leuctra variabilis* n. sp., fore and hind wings.
4. *Leuctra monticola* n. sp., male terminalia, lateral view.
5. *Paraleuctra sara* (Clsn.), prothoracic sternum.
6. *Leuctra variabilis* n. sp., prothoracic sternum.
7. *Leuctra variabilis* n. sp., male terminalia, lateral view.
8. *Leuctra monticola* n. sp., female abdomen, ventral view.
9. *Leuctra variabilis* n. sp., female abdomen, ventral view.
10. *Megaleuctra williamsae* n. sp., male terminalia, lateral view.
11. *Leuctra variabilis* n. sp., labium of naiad.
12. *Paraleuctra sara* (Clsn.), labium of naiad.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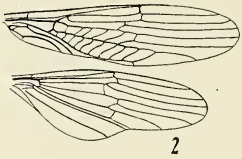
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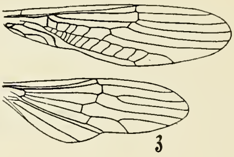
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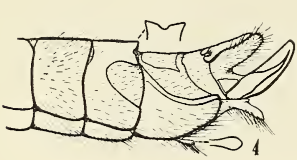
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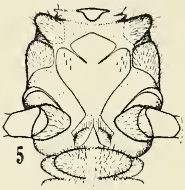
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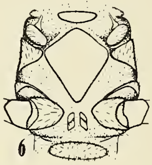
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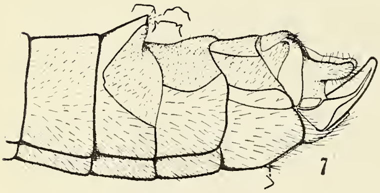
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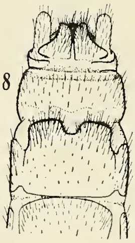
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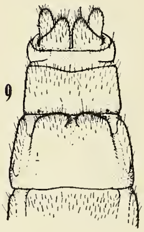
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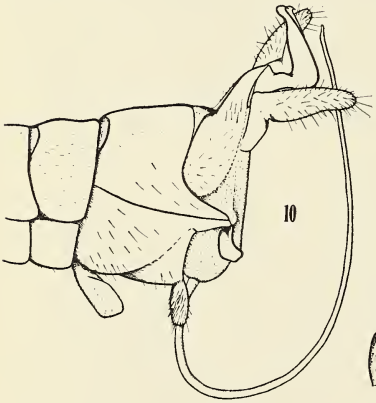
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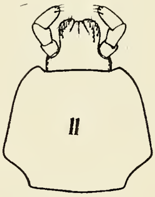
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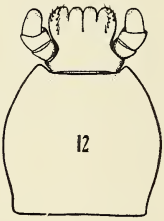
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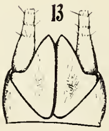
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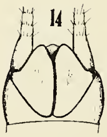
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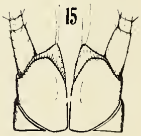
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13. *Paraleuctra sara* (Clsn.), female naiad, ventral abdominal view.
14. *Paraleuctra sara* (Clsn.), male naiad, ventral abdominal view.
15. *Leuctra variabilis* n. sp., naiad ventral abdominal view.

EXPERIMENTAL INFECTION OF HAEMATOSIPHON INODORA (DUGÈS) WITH TRYPANOSOMA CRUZI CHAGAS.[1]

By Luis Mazzotti,[2] Mexico, D. F., Mexico.

Trypanosoma cruzi, as is well known, is a very indifferent parasite which may infect, under natural and experimental conditions, various species of vertebrate (mammals) and invertebrate hosts.

Besides the reduviid bugs which appear to be in nature the more important insect vectors of the trypanosome, different other arthropods have been found to be capable of developing the parasite under experimental and rarely under natural conditions.

Experimental infections in species of *Ixodidae, Hyppoboscidae, Pyralydae* and *Cimicidae* have been reported by several authors. Lent (1939) has given in a very complete table of the species of invertebrates which under natural or experimental conditions have been reported as hosts of *T. cruzi.* The species of Cimicidae listed in that table are the following:

Species.	Author.
Cimex lectularius.	Brumpt 1912.
Leptocimex bouetti.	Brumpt 1912.
Cimex hemipterus.	Brumpt 1913.
Cimex hirundinis.	Brumpt 1913.
Cimex sp. (from swallow's nests).	Brumpt (in Brumpt, Mazzotti and Brumpt 1939).
Cimex stadleri.	Brumpt (in Brumpt, Mazzotti and Brumpt 1939).

Recently the author received from San Juan de Guadalupe, State of Durango, Mexico, several live specimens of *Haematosiphon inodora* (Dugès), a cimicid which has been reported infesting poultry yards in Mexico and in the United States. Observations regarding the experimental infection of this species with *T. cruzi* are reported in this paper.

Dr. Alfredo Nocedal resident physician at San Juan de Guadalupe, Dgo. (Mex.) who collected the insects, indicates that this species usually attacks poultry, but in some cases also humans, especially when the yards are near the bed rooms. This observation is very similar to that made in the United States by Townsend (1894) who writing of this species states that it "has frequently been known to spread from roosts to dwelling houses where it proves to be more formidable than the bed bug."

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[1] From the Institute of Tropical Diseases. México, D. F.

[2] The author is indebted to Mr. H. G. Barber for the identification of *H. inodora.*

Observations.—On June 20, 1940, fifteen adult specimens of *H. inodora* were applied to a mouse infected with *T. cruzi.* This mouse which had been previously inoculated in the laboratory was showing a light infection, only 10 trypanosomes being observed in one hundred fields. Twelve of the bugs fed in about 20 minutes on the mouse. An interesting observation is that 4 of the bugs defecated in less than 5 minutes after feeding.

On July 5, one of the bugs was sacrificed and the intestinal content examined, numerous metacyclic forms of *T. cruzi* being observed.

On July 11, two white mice were inoculated intraperitoneally, with 0.25 cc. of the saline-diluted intestinal content, from two of the infected *H. inodora.*

The incubation period was eleven days in one of the mice; this animal showed, on the 21st day after inoculation a maximum of 50 trypanosomes per field and died on the 23d day.

The other mouse showed an incubation period of 15 days and a maximum of 14 trypanosomes per field on the 22d day. It was sacrificed on the following day. These observations were made on fresh blood smears, using a Zeiss binocular 1.5 × with 7 × oculars and a 20 × objective.

The fact that *Haematosiphon inodora* appears not to have a strict specificity in its feeding habits and the observation made here in regard to its ability to defecate shortly after feeding, apparently show that this species may be apt under certain natural conditions to act as a vector of trypanosomiasis for mammals. It would be of interest to observe if *H. inodora* is naturally infected in the same localities where triatomas infected with *T. cruzi* are found.

Conclusions.—*Haematosiphon inodora* (Dugès) may be infected under experimental conditions with *T. cruzi.* The lack of strict feeding specificity which this species of Cimicidae shows, apparently indicates that this insect may be capable of acting in nature as a vector of *T. cruzi,* under special conditions.

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ADDITIONS TO THE LIST OF CINCINNATI COLEOPTERA.

By Joseph F. Wright and John Whitehouse,
Cincinnati, Ohio.

Since the late Charles Dury published an addition to the list of Cincinnati Coleoptera in Vol. XXI, No. 2, of the Journal of the Cincinnati Society of Natural History, there have been no further additions published. We therefore feel that the time which has elapsed has been sufficient to bring to light many heretofore unobserved and interesting beetles, some common, some exceedingly rare.

The list is made up of records from the authors' collections; it does not include any records from Mr. Dury's extensive collection, although it doubtless contains most of the following records as well as a good many others which are not listed here. The time for the task of going through that collection not being immediately available, we have put its investigation aside on the advice of Mr. Ralph Dury. At a later date the theretofore unrecorded forms found in the Dury collection will be published.

The terminology is the same as that used in Blatchley's "Coleoptera of Indiana" except in forms which are not listed therein. The validity of the species here listed is in accordance with Leng's check list and its supplements to date.

The authors take this occasion to acknowledge with deepest thanks the help which Mr. Dury has given them in allowing them to use freely his father's collection for comparison and identification of specimens, and in allowing them to use books and pamphlets which might otherwise have been inaccessible to them. Mr. Whitehouse likewise extends his thanks to Miss K. P. Perin for both the numerous specimens for which he is indebted to her, and for her assistance in making various identifications.

We here present the following additions to the lists of Cincinnati Coleoptera (observed within a radius of twenty miles of Cincinnati); 135 new species and 13 new varieties are presented, bringing the total number of species observed here to 2504:

(Names followed by an asterisk(*) were previously published in the "Proceedings of the Junior Society of Natural Sciences" Vol. I; Nos. 10 and 11.)

Cicindelidae

Cicindela scutellaris lecontei Hald.

rufiventris Dej.

CARABIDAE

Cychrus andrewsi germari Chaud.*
stenostomus indianae Leng
Notiophilus novemstriatus Lec.
Clivina punctigera Lec.
americana Dej.
Pasimachus costifer Lec.*
Bembidion fugax Lec.
Pterostichus relictus Newm.
Loxandrus rectus Say
duryi Wright
agilis Dej.
celer Dej.
cincinnatiensis Csy.*
Amara pennsylvanica Haywd.
Diplochila laticollis Lec.*
major Lec.*
impressicollis Dej.
obtusa Lec.
Platynus angustatus Dej.
parmarginatus Ham.
cincticollis Say
reflexus Lec.
nutans Say
lutulentus Say
Galerita obliqua Csy.
bicolor rhombiceps Csy. (A variety of questionable validity.)
lecontei Dej.
caseyi Leng
Thalpeus dorsalis Brullé
Lebia rhodopus Schwarz
furcata Lec.*
Apristus cordicollis Lec.
Blechrus nigrinus Mann.
Brachynus quadripennis Dej.
alternans Dej.
pulchellus Blatch.
lateralis Dej.
Chlaenius aestivus Say
Oodes amaroides Dej.
Agonoderus pauperculus Dej.
Harpalus pennsylvanicus compar Lec.
convivus Lec.
Selenophorus opalinus Lec.
pedicularis Dej.
Stenolophus fulginosus Dej.
Anisodactylus interpunctatus Kby.
furvus Lec.
dulcicollis Laf.

HALIPLIDAE

Cnemidotus muticus Lec.
pedunculatus Robts.

DYTISCIDAE

Hydroporus ohionis Fall
Agabus disintegratus Crotch
obtusatus Say
punctatus Melsh.
gagates Aubé

GYRINIDAE

Dineutes hornii Robts.

HYDROPHILIDAE

Hydrochus inaequalis Lec.
Helocombus bifidus Lec.
Sphaeridium scarabaeoides Linn.

SILPHIDAE

Necrophorus pustulatus Hersch.

STAPHYLINIDAE

Cryptobium atriceps Csy.

COCCINELLIDAE

Adalia bipunctata Linn.
Rodolia cardinalis Muls.

ENDOMYCHIDAE

Endomychus biguttatus Say

EROTYLIDAE

Languria lecontei Crotch

CUCUJIDAE

Silvanus imbellus Lec.

DERMESTIDAE

Dermestes caninus Germ.
Anthrenus verbasci Oliv.

HISTERIDAE

Hister depurator Say
exaratus Lec.

PARNIDAE

Elmis vittatus Melsh.

DASCYLLIDAE

Ptilodactyla serricollis Say

ELATERIDAE

Glyphonyx inquinatus Say
Melanotus longicornis Blatch.
canadensis Cand.
sagittarius Lec.
divarcarinus Blatch.
debilis Blatch.
Elater sayi Lec.
sanguinnipennis Say*
Asaphes brevicollis Cand.
Melanactes morio Fab.

BUPRESTIDAE

Agrilus anxius Gory
lacustris Lec.
Chrysobothris trinervia Kby.
Dicerca punctulata Schon.*

LAMPYRIDAE

Ditemnus latilobus Blatch.
Telephorus tuberculatus Lec.
Podabrus modestus flavicollis Lec.

MALACHIDAE

Attalus pallifrons Motsch.

CLERIDAE

Hydnocera pubescens Lec.

PTINIDAE

Lyctus planicollis Lec.

CUPESIDAE

Cupes concolor Westwood

SCARABAEIDAE

Euphoria herbacea Oliv.
Lachnosterna profunda Blanch.
drakei Kby.
anxia Lec.
perlonga Dav.
implicata Horn
dubia Smith
futilis Lec.
Cyclocephala immaculata Oliv.
nigricollis Brm.
Ligyrus gibbosus Dej.

CERAMBYCIDAE

Liopus punctatus Hald.
Mecas pergrata Say
Tetrops monostigma Haldm.
Tetraopes femoratus Lec.
femoratus basalis Lec.
Acmaeops bivittata nigripennis Lec.
directa Newman
Lepturges symmetricus pictus Lec.

CHRYSOMELIDAE

Coptocycla signifera Herbst
bicolor Fabr.
plicata Bon.
Galerucella luteola Hull
integra Lec.
Crioceris duodecimpunctata Linn.
Glyptoscellis crypticus Say*
Typophorus canellus quadrinotatus Say
pumillus Lec.
sellatus Horn
Donacia subtilis Kunz
Microrhopala vittata Fabr.
Systena taeniata Say
frontalis Fabr.
Bassareus clathratus Melsh.
Haltica aenescens Blatch.
Pachybrachys confusus Bowd.
sticticus Blatch.

thoracicus Melsh.
aterrimus Oliv.
quadriguttatus Lec.
bivittatus Say
Lema sexpunctata Oliv.
Griburius scutellatus Fab.

BRUCHIDAE

Bruchus pectoralis Horn

TENEBRIONIDAE

Diaperis maculata Oliv.

CISTELIDAE

Hymenorus pilosus Melsh.

MORDELLIDAE

Anaspis rufa Say
Mordellistena divisa Lec.
intermixta Helm.
dimidiata Helm.
Mordella discoidea Melsh.

ANTHICIDAE

Sapintus pubescens Laf.

MELOIDAE

Epicauta marginata Fab.

NEW VARIETY OF ANOPHELES PSEUDOPUNCTIPENNIS (DIPTERA, CULICIDAE).

By Luis Vargas, Mexico, D. F., Mexico.

The extensive distribution of *A. pseudopunctipennis* covering discontinuously the area occupied northerly by the West of the United States and southerly by the northern part of the Argentine Republic in connection with the fact that in some regions it was considered undoubtedly to be a dangerous carrier of malaria as against evidence brought against such a role, had long since presented the question as to whether under the name of *pseudopunctipennis,* there were indicated a number of varieties or genetically different species with unequal qualities in regard to transmission.

Vargas (1939) and Aitken (1940) applied the methods followed in the study of the eggs of the *Anopheles maculipennis* complex to the study of *A. pseudopunctipennis* eggs and were able to distinguish the varieties: *typicus, boydi* and *franciscanus.* Now the author has found a new variety with eggs of the same general shape as those of the typical form but differing only in minor details. In the typical form the egg shows a distinct collar near the narrow end, both floats touch in the middle line, the float's length is more than 65 per cent of the total length of the egg and the number of frills is about 30. In *franciscanus* the float's length is about 55 per cent of the total length of the egg and the number of frills is about 11 or 14. In *boydi* the floats do not touch, there is only a fringe dividing the ventral and dorsal areas and no collar.

The new variety is distinguished in the egg stage by the shorter distance from the end of the float to the insertion of the egg's collar. In the typical form as is figured by Rozeboom (1937) and mentioned by Vargas (1939) the distance between the end of the float to the insertion of the collar is equal to 73.43 microns while in the present form there is scarcely half that distance, the floats almost touching the collar. The larval stage is characterized by the lack of the long, black tails of the postspiracular apparatus, and by the branched antennal hair present in most of the specimens. The adult females differ by having the distal end of the palpi black, in contrast with the white apex, as in all the recorded females of the typical form. Males show the mesosome with five pairs of small stems.

The new variety is present in the State of Chihuahua, Republic of Mexico, and was found covering an area of more than 150 square kilometers; it is present in the cities of Ciudad Juarez, Ciudad Guerrero, Madera, Chihuahua, General Trias and Mojaca Chico. It was the only *Anopheles* captured in the months of July and August of the present year. The adults, males and females, enter houses as well as stables. The larvae breed in sunlit streams and pools.

The variety was named after Dr. W. V. King of the U. S. Dept. of Agriculture but since *kingi* is an African species of the genus *Anopheles,* subgenus *Myzomyia,* it is presented here under the name of *A. pseudopunctipennis* var. *willardi.* Cotypes in the collection of Dr. King and of the Instituto de Salubridad y Enfermedades Tropicales. A. Martínez Palacios collected all the specimens.

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Vargas, L.—1939.—Medicina.—t. xlx, no. 347. México, D. F.

NEW SPECIES OF IRBISIA REUTER (HEMIPTERA, MIRIDAE).

By Harry H. Knight, Iowa State College, Ames, Iowa.

Irbisia shulli n. sp.

Differs from *sericans* Stål in the shorter antennal segments and uniformly black tibiae; color suggestive of *nigripes* Kngt., but differs in the longer rostrum and broader head; first antennal segment not equal to width of vertex between eyes. Color uniformly black, moderately shining; female brachypterous.

Male. Length 6 mm., width 2.6 mm. Head: width 1.38 mm., vertex .75 mm.; basal carina bluntly prominent, declivous to vertex level, frons broad, moderately convex; tylus arcuate as viewed from the side, juga and lora strongly convex, eyes moderately prominent. Rostrum, length 2.04 mm., reaching slightly beyond middle of hind coxae. Antennae: first segment, length .65 mm.; II, 1.86 mm., cylindrical, finely pubescent; III, 1.03 mm.; IV, 1.21 mm. Pronotum, length 1.12 mm., width at base 2.03 mm.; disk punctate, some punctures confluent, rugulose; calli moderately convex, confluent anteriorly, each with a foveate impression near inner anterior angles; lateral margins rather sharply angulate, longitudinal outline slightly concave, anterior angles sharply prominent; ventral margin of propleura, ostiolar peritreme, and narrowly bordering base of middle coxae, white. Scutellum moderately convex, transversely rugulose, punctures indistinct. Dorsum clothed with erect, dusky hairs, intermixed with some recumbent, sericeous pubescence which is more evident on pronotum and basal half of hemelytra. Hemelytra rugulose, punctures rather indistinct, embolar margins only slightly arcuate; cuneus moderately deflexed, membrane well developed, color uniformly dark fuscous or blackish, extending beyond tip of cuneus for space equal to length of cuneus. Legs uniformly black, shining, without trace of paler areas. Venter black, shining.

Female. Length 5.3 mm. to tip of abdomen; brachypterous, membrane not extending beyond tip of cuneus, cells not developed, tip of abdomen exposed. Head: width 1.47 mm., vertex .82 mm. Rostrum, length 2.03 mm., reaching slightly beyond middle of hind coxae. Antennae: segment I, length .62 mm.; II, 1.77 mm.; III, 1.04 mm.; IV, 1.17 mm. Pronotum: length 1.06 mm., width at base 1.95 mm., anterior angles prominent, width 1.3 mm. Hemelytra brachypterous, embolar margins arcuate, width 3.03 mm.; cuneus short, length .82 mm., apex rounded. Color and pubescence similar to the male.

Holotype: ♂ May 7, 1938, alt. 1000 ft., Lenore, Idaho (W. E. Shull); author's collection. *Allotype:* same data as the type. *Paratypes:* numerous specimens taken by Dr. Shull on wheat plants and and wild grasses surrounding the fields; damage to wheat plants is reported. IDAHO—Lenore: 18 ♂, 25 ♀ May 19, 1937, alt. 1000 ft. (W. E. Shull); 6 ♂ 3♀, same date (R. E. Miller). Juliaetta: 4 ♂ 2 ♀ May 16, 1936, alt. 1083 ft. (T. A. Brindley); 2 ♂ 1 ♀, same date (R. E. Miller). Lewiston: 2 ♂ 3 ♀ May 17, 1936, (R. E. Rodock). OREGON—Le Grand: ♂ 2 ♀ May 12, 1930, alt. 2800 (H. A. Scullen). WASHINGTON—Anatone: 2 ♂ 1 ♀ May 16, 1937 (R. E. Rodock). Tampico: ♂ May 10, 1926 (E. W. Davis); 3 ♂ 3 ♀ May 16, 1932 (A. R. Rolfs). Tieton: 4 ♂ May 12, 1931 (F. P. Dean). Toppenish: 6 ♂ 4 ♀ May 15, 1926 (E. W. Davis). Yakima: 2 ♂ June 24, 1932 (A. R. Rolfs).

Irbisia fuscipubescens n. sp.

Distinguished from allied species by the short, dark brown to fuscous pubescence; length of first antennal segment equal to (♂) or less than (♀) width of vertex; color black, tibiae yellow to fuscous.

Male. Length 5.5 mm., width 2.85 mm. Head: width 1.25 mm., vertex .58 mm.; basal carina apparent as a blunt ridge, impressed just before on base of vertex, frons moderately convex, smooth, shining, tylus moderately arcuate as viewed from the side, juga and lora moderately tumid, eyes ovate as viewed from the side, golden brown; black, shining, sparsely clothed with golden brown pubescence. Rostrum, length 1.86 mm., reaching upon tips of middle coxae but not quite attaining posterior margins, black. Antennae: segment I, length .57 mm.; II, 1.64 mm., nearly cylindrical, equal to thickness of segment I although slightly more slender on basal half; III, .84 mm.; IV, .78 mm.; black. Pronotum: length 1.12 mm., width at base 2.05 mm.; disk moderately, evenly convex, coarsely rugulose punctate, shining black, ventral margin of propleura behind coxal cleft, white; lateral margins nearly straight, rather sharply angled to propleura, anterior angles distinct; calli moderately convex, a foveate impression on inner anterior angles, collar constriction sinuate above; sparsely clothed with short, inconspicuous, golden brown to fuscous pubescence. Scutellum moderately convex, strongly transversely rugulose, punctures indistinct; mesoscutum narrowly exposed.

Hemelytra moderately convex, costal margins distinctly arcuate, costal edge sharp; black, shining, shallowly rugulose punctate, clothed with short, fine, suberect dark brown to fuscous pubescence; cuneus deflexed, subtriangular, outer margin slightly arcuate; membrane and veins uniformly blackish. Body color black, shining, ostiolar peritreme and narrowly bordering base of middle coxae, white; venter clothed with brown to fuscous pubescence. Legs black, tibiae except apices and knees, and tips of femora, yellow; hind tibiae frequently with basal one-third largely blackish.

Female. Length 5.5 mm., width 2.9 mm.; more robust than the male but very similar in color and pubescence, membrane well developed. Head: width 1.34 mm., vertex .69 mm. Rostrum, length 1.94 mm., reaching upon tips of middle coxae. Antennae: segment I, length .57 mm., distinctly less than width of vertex; II, 1.73 mm.; III, .99 mm.; IV, 1.14 mm. Pronotum: length 1.25 mm., width at base 2.12 mm.

Holotype: ♂ May 21, 1932, Tampico, Washington (A. R. Rolfs); author's collection. *Allotype:* same data as the type. *Paratypes:* 4 ♂ 5 ♀, taken with the types. WASHINGTON—Clear Lake: ♀ May 21, 1932 (A. R. Rolfs). Tampico: ♂ ♀ May 10, 1926 (E. W. Davis). Tieton: 3 ♂ 7 ♀ May 31, 1926 (E. W. Davis); 2 ♂ 2 ♀ May 21, 1932, Tieton Canyon (A. R. Rolfs). Toppenish: 2 ♂ 2 ♀ May 2, 1926, 7 ♂ 3 ♀ May 15, 1926 (E. W. Davis). ALBERTA—Banff: ♂ July 17, 1925 (Owen Bryant).

Irbisia elongata n. sp.

Differs from *californica* Van D. in the longer rostrum and more elongate body form; differs from *brachycera* Uhl. in the more elongate body form and in the longer antennal segments, the length of segment II greater than twice the width of vertex.

Male. Length 5.3 mm., width 2.1 mm. Head: width 1.3 mm., vertex .71 mm.; eyes prominent, rounded, vertex flat, basal carina indistinct; tylus arcuate as viewed from the side, juga tumid, lora strongly convex, a small yellow spot at base; black, shining, clothed with erect silvery hairs. Rostrum, length 2.16 mm., reaching to middle of hind coxae, yellowish brown, last two segments becoming blackish. Antennae: segment I, length .74 mm., black, pale pubescent; II, 1.95 mm., cylindrical, brownish black, black on base and apex; III, 1.17 mm., black; IV, 1.04 mm., black. Pronotum: length 1.14 mm., width at base 1.86 mm.; disk moderately convex, coarsely rugulose punctate, calli moderately convex, depressed just behind; disk with lateral margins rounded, slightly concave, anterior angles bluntly prominent; clothed with erect, long silvery hairs and intermixed with sericeous pubescence; black, ventral margins of propleura whitish. Scutellum moderately convex, roughly transversely rugulose; mesoscutum moderately exposed.

Hemelytra convex, embolium sloping downward, costal margin distinctly arcuate yet not apparent as viewed from above; shallowly, rugulose punctate, black, moderately shining, clothed with suberect, pallid hairs and intermixed with silvery sericeous pubescence, stronger than in *brachycera* Uhl.; membrane pale brownish, veins dark brown. Body color black, ostiolar peritreme, margins of epimera and episterna bordering mesocoxae, pallid; venter shining, heavily clothed with erect pallid pubescence. Legs yellowish to white and marked with black, coxae black, apices and mark near base yellowish; femora more or less black on basal half, dorsal and ventral aspect yellowish, the dark color usually terminating in a series of dots, trochanters with black spot; tibiae yellowish to white, apex and spines black; tarsi and claws black.

Female. Length 6.2 mm., width 2.3 mm. Head: width 1.38 mm., vertex .78 mm. Rostrum, length 2.3 mm., reaching to middle of hind coxae. Antennae: segment I, length .74 mm.; II, 1.8 mm., dark brown, black at base; III, 1.08 mm.; IV, 1.04 mm. Pronotum: length 1.18 mm., width at base 1.9 mm. More robust than the male but very similar in color and pubescence; coxae more broadly and the xyphus, white.

Holotype: ♂ July 30, 1927, Sundance, Wyoming (H. H. Knight); author's collection. *Allotype:* same data as the type. *Paratypes:* ♀, taken with the types. IDAHO—Genesee: 2 ♂ May 23, 1936 (R. E. Miller). Juliaetta: 2 ♂ May 16, 1936 (R. E. Miller). WASHINGTON—Mt. Adams: 4 ♂ 8 ♀ June 26, 1932; ♂ Aug. 3, 1930 (A. R. Rolfs). "Wen. Mts.": 2 ♂ 6 ♀ July 9, 1930 (F. P. Dean & A. R. Rolfs). BRITISH COLUMBIA—Chilcotin: ♀ May 27, 1929 (G. J. Spencer).

Irbisia brachycera (Uhler)

1872 *Rhopalotomus brachycerus* Uhler, Hayden's Surv. Terr., Rept. for 1871, p. 416.

1921 *Irbisia arcuata* Van Duzee, Proc. Calif. Acad. Sci., (ser. 4) XI, p. 148.

In past years the identity of this species has been in doubt, and there is some confusion of records. The writer has examined the type specimen in the U. S. National Museum and made comparison with other Colorado specimens. The most distinctive characters mentioned in the original description are: "rostrum reaching upon the posterior coxae, yellowish"; . . . "apical half of coxae . . . yellowish white." The writer finds that a combination of these two characters will serve to separate *brachycera* Uhler from its nearest allies.

Records: COLORADO—"Colo." 1160, 1889, and 2076 (C. F. Baker). The type locality is recorded "Weld County," most likely from the vicinity of Fort Lupton. Fort Collins: ♂ ♀ June 12, ♀ June 28, 1900; ♂ ♀ June 29, 1901 (E. D. Ball). IOWA—Sioux City: ♂ June 13, 1922 (C. N. Ainslie). MONTANA—Sidney: 2 ♀ June 14, 1913. NEBRASKA—Pine Ridge, 1 ♀. Sioux County, 1 ♀. NORTH DAKOTA—♀ June 14, 1922, Beach (C. N. Ainslie). ALBERTA—Medicine Hat: ♂ May 18, 1926 (F. S. Carr).

BOOK NOTE.

Insetos do Brasil—vol. I, by A. da Costa Lima; pp. i–x + 1–470, figs. 1–217. Serie Didactica, no. 2, da Escola Nacional de Agronomia, Rio Janeiro (Brazil). (No price given.)

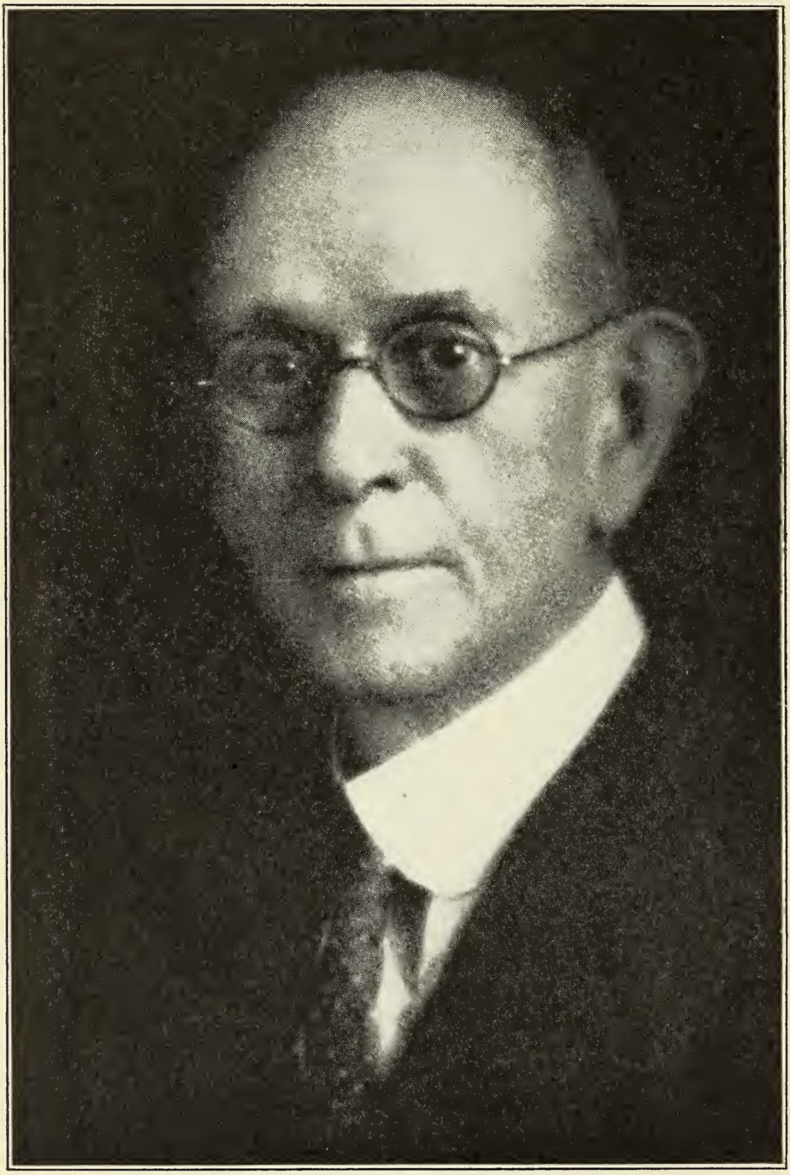
This work is a formal treatise on systematic entomology, with especial reference to the Brazilian entomofauna. It covers the Orders from Thysanura to Thysanoptera. The first chapter deals with general zoological classification and nomenclature; and the second with classification of insects and bibliography of entomology. In the succeeding chapters each Order is defined, its morphology and biology set forth, and its classification developed in excellent keys to the families. Each chapter carries an extended bibliography of the principal works on the Order. There is naturally, much stress on economic status. The general index includes names of authors as well as of groups, down to genera and species.

The book is paper bound, in accord with continental practice, and well printed on good book paper. It is an outstanding work; and we look forward to the volumes to follow. J. R. T.–B.

EDWARD PAYSON VAN DUZEE.

An Appreciation.

By J. R. de la Torre-Bueno, Tucson, Ariz.



The entomological labors of my late friend Mr. Van Duzee have been adequately covered in "The Life and Works of Edward Payson Van Duzee" by Dr. E. O. Essig and Mr. R. L. Usinger, in Pan Pacific Entomologist for October 1940.

This is my personal farewell to a great entomologist and splendid friend; to one who was always encouraging, helpful; to one who was never too busy to share with others the riches of his mind and his vast stores of knowledge. Never did he refuse help; never was he too occupied to aid others.

To the grief of his passing is added the sadness of the knowledge that with it closes a great era in American entomology, especially in his chosen field of hemipterology. He was without doubt the greatest in this country and one of the few great world-hemipterists. Van Duzee was a standing example of a man who without previous training, without a college degree, was able by his own effort to make himself a master of his science. Working alone, he brought order and light to a sadly unorganized branch of American entomology. He ranks with Say, LeConte, Horn, Wheeler, Comstock, Leng. He outstrips every other hemipterist in America. No one in justice can believe otherwise.

We who are still here—Alas! so few!—have laid upon us the burden of the progress of hemipterology, not alone here, but abroad as well. For, in the blood of war, our science languishes, our fellows abroad die in concentration camps, at the hands of tyrants under whatever name, their work is destroyed under bombs, their very thought is shackled by political and social ideologies.

The remnants of free science lie in our hands; and one of our great leaders is gone! We are bereft in a warring world. Edward Payson Van Duzee has entered into the Great Peace. He has left us a heritage of accomplishment, which we, his heirs, must nourish and increase.

His great work is his lasting monument.

We note with deep regret the deaths of Dr. Samuel Henshaw, at Cambridge, Mass., and of Dr. Hugo Kahl, at Pittsburgh, Pa.

> "The Moving Finger writes, and having writ,
> Moves on: nor all your Piety nor Wit
> Shall lure it back to cancel half a line,
> Nor all your Tears wash out a Word of it."
>
> —OMAR KHAYYAM.

HELP NOTES TOWARD A REVISION OF THE GENUS HARMOSTES BURM. 1835.

J. R. de la Torre-Bueno, Tucson, Ariz.

The data and discussion following are nothing but preliminary notes toward a monograph of the Genus *Harmostes* of the Family Corizidae.

Neither nomenclatural nor higher taxonomic problems will be considered. This is simply a preliminary gathering of data—data assembled for my Synopsis of the Heteroptera now in progress, taken from the literature with much care and labor. No apology or explanation is given for preparing the subjoined key to species of the genus from original descriptions or primary discussion. I have read apologies for making keys in part from descriptions. Such apology has always seemed to me to be a damning indictment of descriptions. If such descriptions be so unreliable as to be useless as sources of distinguishing characters for keys, how can they be relied on as a primary basis for an accurate identification? It follows from this that *all* specimens named by such a description are completely questionable, no matter who identified them, or any one of them. It leaves us at once in the hands of the worshippers at the shrine of the type fetish. These votaries are all for junking here and there names for which the type specimen of a species is not extant; and if a genus be based on such species, of course, the genus is at once abolished. In this view, the present absence of Linnean or Fabrician type specimens of certain species, and particularly where such a species is the type of a genus, invalidates the species and with it, as a natural consequence, the genus based thereon. I doubt that the proponents and practitioners of this theory either realize its absurdity or weigh its widespread evil results. What a boon it would become to the mihi-itchers; and what a golden opportunity it would afford them to perpetuate their own insignificance by retyping and renaming such rejected old and accepted genera and species!

Primarily, I worked from Gibson's paper on *Harmostes* in elaborating a key. Discrepancies soon became evident; and, at times, actual errors. For instance, *H. prolixus* Stål was set by Stål himself in Enumeratio I: 220, in the section with *smooth* (or unarmed) pronotal margins: "aa. Thoracis marginibus lateralibus inermibus, integris; ventre anterius haud vel obsoletissimi sulcato.—b. Articulo primo antennarum longe ultra apicem capitis extenso.—9. *H. prolixus* Stål." But Gibson puts it in his key in the section with *toothed* pronotal margins: "1. Lateral margins of the pronotum crenulated—2—2. (to 6) . . . *prolixus* Stål." There are other discrepancies in the key quite as notable as this. Also, his translations into English of descriptions and comments in other languages are frequently open to question, as for example, his translation of the original Spanish and Latin of Berg's description of *H. procerus.* This translation is the *exact opposite* of what Berg *did* say. Gibson's translations of descriptions and comments will be referred to at length further on.

Here we present a new key to take in all the known species of *Harmostes,* to replace Gibson's. It is drawn up largely from original descriptions, checked with secondary redescriptions and comments of such competent authorities as Stål; and checked with determined specimens of species as accepted heretofore by informed consensus of opinion.

Genus *Harmostes* Burmeister 1835

Key to Species.

1. Anterolateral margins of the pronotum *serrate* 2
   Anterolateral margins of the pronotum *smooth* 5
2. Rostrum extending onto the abdomen (passing base of abdominal segment III—Stål); (antennal segment I surpassing head by about one-half its own length, II slightly shorter than III, antennal tubercles acutely prominent, hardly spinose; length, 9–10 mm, width, 3 mm.).
   nebulosus Stål 1862
   Mexico, Guatemala.
   Rostrum *not* extended onto the abdomen 3
3. Rostrum reaching base of abdomen; antennal segment II shorter than III; (antennal tubercle produced into long acute spines; length, 7–8 mm.) . . . *serratus* Fabricius 1794
   United States, Mexico, West Indies, Argentine.
   Rostrum nearly reaching or slightly passing posterior coxae; antennal segment II equal or subequal to III 4
4. Rostrum reaching nearly to posterior coxae; antennal segment II equal to III; length, 6.25 mm. . . . . . . *affinis* Dallas 1852
   Florida, Texas.
   Rostrum just passing posterior coxae; antennal segment II subequal to III; (antennal segment I very incrassate, about reaching apex of head; humeri *very* broadly rounded, anterior angles of pronotum prominent, reflexed); length, 9

mm., width, 3 mm. . . . . *formosus* Distant 1881
Texas, Mexico.

5. Bucculae extending beyond posterior margin of the eyes; (antennal segment I exceeding apex of head by one-half its own length, II shorter than III; rostrum hardly reaching posterior coxae; anterior angles of the pronotum acute; length, 6.25 mm.) . . . . *reflexulus* Say 1831
All United States into Mexico.

Bucculae *not* extending beyond posterior margin of the eyes. 6

6. Length 7 mm. or more 7
Length *less than* 7 mm. 13

7. Antennal segment II thicker at base than at apex, (I barely one-third length of head, II shorter than III; length, 10 mm.)
signoreti Reed 1899 (*rhaphimerus* Signoret 1864, nec Spinola 1853)
Chile.

Antennal segment II of equal thickness throughout 8

8. Antennal segment II two-thirds or less the length of III; (IV one-half shorter than III; pronotum with a percurrent median carina; length, 8.4 mm., width, 4.2 mm.).
rhaphimerus Spinola 1853
Chile, Argentine.

Antennal segment II *more* than two-thirds the length of II, or II and III equal or subequal 9

9. Antennal segment II *shorter* than III 10
Antennal segment II equal or subequal to III 11

10. Antennal segment I slender, smooth; (head clothed with bright hairs; anterolateral margins of the pronotum nearly straight; scutellum with a median carina, lateral margins raised, strongly, remotely punctate; length, 8–9 mm.).
gracilis Reed 1899
Chile.

Antennal segment I stout, granulate; (antennal tubercles spined, tylus slightly projecting acutely beyond juga; anterior angles of the pronotum spined; scutellum long, constricted at apex; length, 8 mm.) (structural characters derived from figure in Biologia Centrali Americana).
subrufus Distant 1881
Arizona, Guatemala.

11. Antennal segments II and III subequal; (segment I nearly smooth; rostrum *not* passing intermediate coxae; anterior angles of the pronotum acute; length, 7–8 mm.—sec Spinola,

4.2 mm.) . . . *chilensis* Dallas 1852 (= *minor* Spinola 1853)
Chile, (United States?).

Antennal segments II and III equal 12

12. (Antennal segments II and III equal in length to the head; rostrum attaining base of ventral segment II; pronotum shorter than the head; scutellum tricarinate; venter deeply sulcate to segment V; length, 7–8 mm.).
angustatus Van Duzee 1918
Arizona, California.

(Antennal segment IV slightly longer than I; bucculae rather prominent, disappearing at the anterior margin of the eyes; humeri well-rounded; length, 7–9 mm.).
croceus Gibson 1918
Oregon, California, Texas.

[N. B.—In this section belong *H. prolixus* Stål 1860 (Brazil), and *H. bicolor* Distant 1881 (California, New Mexico, Colorado, Texas, Mexico). The description of these two species are so deficient in *structural* characters that it is impossible to place them in this key. The very brief description of *H. prolixus* Stål furnishes but one such character, "lateral spines (of head) subdivergent," and the length and width, 7 mm. long, by 2 mm. wide. The brief color description from the original Latin reads: "Subelongate, testaceous white, above darker, fusco-punctate; lateral margins of the thorax dilute, costal margins of the hemelytra impunctate, fusco-consperse; membrane dilute fuscescent irrorate; disc of pectus, a median line on venter and one marginal on each side, posterior femora (except base) and the apex of the posterior tibiae fuscous. Male. Length 7, width 2 mm.—(Mus. Stål). Head not longer than the width, lateral spines short, subdivergent; Thorax nearly as long as wide." In view of the lack of certainty, Gibson's redescription is not considered.

In *H. bicolor,* Distant (1881) furnishes the few structural characters abstracted from his description: Antennae with basal joint considerably passing the apex of the head, and much shorter than the second joint. Pronotum coarsely punctate; lateral angles subprominent. Length, 7 mm. In the brief division of the species he enumerates, he places *bicolor* in the section with smooth pronotal margins.]

13. Antennal segment I scarcely or slightly exceeding the apex of the head; (length, 6.25 mm.) . . . . *fraterculus* Say 1831
United States, Mexico, Guatemala.

Antennal segment I greatly exceeding the apex of the head 14

14. Membrane immaculate; (lateral spines of the head parallel; length, 5 mm., width, 2 mm.) .... *apicatus* Stål 1859
Chile, Argentine, Paraguay, Brazil.
Membrane spotted with fuscous 15

15. Margins of the hemelytra black-spotted; (scutellum rounded and excavate at apex; head rugose, acute; humeri rounded and excavate at apex, punctate, rugose; corium densely punctate with coarse confluent punctures, veins very prominent; length, 5–6 mm.) ...... *marmoratus* Blanchard 1853
Chile.
Margins of the hemelytra infuscate; (apex of the antennal tubercles acutely produced; rostrum passing the intermediate coxae; humeri hardly produced, nearly rounded, anterior angles of the pronotum subacute, *posterior angles* with a small spine; scutellum oblong triangular, narrowed toward apex, which is elliptical with a smooth longitudinal ruga; membrane subhyaline, with two or three obsolete fuscous vittae; length, 5–6.5 mm., width, 1.75–2 mm.)
procerus Berg 1879
Argentine.

The preceding key is neither final nor perfect—nothing ever is—but it is as accurate as possible in the absence of a complete monographic revision of the genus. When, or if, such a revision will be made is on the knees of the gods.

Synonymic List of the Described Species of *Harmostes* Burmeister
(Not in taxonomic order)

Anterolateral margins of the pronotum serrate

1. *affinis* Dallas 1852 Cat. Hem. II: 522
2. *formosus* Distant 1881 Biologia Centrali Americana, Heteroptera I: 167
3. *nebulosus* Stål 1862 Hem. Mex. 307
4. *serratus* Fabricius 1794 Ent. Syst. IV: 75
   =*perpunctatus* Dallas 1852 op. c. 521
   =*gravidator* Fabricius 1794 op. c. 133

Anterolateral margins of the pronotum smooth.

5. *angustatus* Van Duzee 1918 Proc. Calif. Ac. Sci (4) VII: 277
6. *apicatus* Stål 1859 Eug. Resa 238
7. *bicolor* Distant 1881 op. c. 167, pl. 15, fig. 17

8. *chilensis* Dallas 1852 op. c. 521
    =*minor* Spinola 1853 Fauna Chilena, in Gay's Hist. Chile VII: 165
9. *croceus* Gibson 1917 Ent. News XXVIII: 445
10. *fraterculus* Say 1831 Hem. New Harm. p. 10
11. *gracilis* Reed 1899 Sinops. Hem. Chile, p. 53 (of reprint)
12. *marmoratus* Blanchard 1853 Fauna Chilena (supra), p. 166
13. *procerus* Berg 1879 Hem. Arg. p. 91
14. *prolixus* Stål 1860 Rio Hem. p. 37
15. *reflexulus* Say op. c., p. 10
    =*virescens* Dallas 1852 op. c. 520
    =*costalis* H. S. 1853 Wanz. Ins. IX: 220, fig. 992
    =*bruesi* Bergroth 1913 Ent. News XXIV: 266
16. *rhaphimerus* Spinola 1853 op. c. 164
17. *signoreti* Reed 1899 op. c. 57
    =*rhaphimerus* Signoret 1864 Ann. Soc. Ent. Fr., p. 560, nec Spinola 1853 above.
18. *subrufus* Distant 1881 op. c. p. 167, pl. 15, fig. 16.

In *Harmostes* there apear to be at this writing 18 recognized species, synonyms naturally not included. How many of these species may later be cast into synonymy depends entirely on a thorough revision of the genus with extant types and authentic specimens from the type localities in hand. To control species properly, in view of the very loose descriptions, is difficult because of the highly variable color characteristics within species. As an example, we may take the widespread and abundant *H. reflexulus* Say, which varies from an indefinite entire grayish to a stramineous or even yellow color, the grayish in general varying from concolorous to extensive darker markings on the corium. In this connection, *H. virescens* Dallas 1852 is treated as a straight synonym of *H. reflexulus* Say 1831, for the reason that there is no apparent segregation of the habitat or of the foodplant, even here in Arizona, where the stramineous form is abundant, in contrast with the more northern localities in which it is not. In view of the indefinite nature of the color changes in the genus, it seems undesirable to perpetuate doubtful varietal names.

Now, as to Gibson's reproductions of original descriptions, where these are from English originals, no checking has been done; where they are from translations from other languages, the following is the result:

Harmostes Burmeister 1835

In the generic description Gibson omits "strikingly" different; antennal segments "two following delicate" should be *thin*, "fourth swollen at the apex" is *"club-shaped"*; omits entirely "head at base with a spine near the antennae, the head produced anteriorly between the antennae"; omits "scutellum and upper wings as in the preceding" (*Corizus*).

H. nebulosus Stål (p. 441)

This is a redescription. Gibson says "Rostrum extending beyond metasternum"; Stål states in his comment "Rostrum exceeding base of third ventral segment."

H. affinis Dallas (p. 442)

Another redescription. Gibson writes "Rostrum extending beyond the metasternum"; Dallas's description says "rostrum hardly reaching the base of the posterior feet." The latter makes no mention of the pronotal margins, although Stål does in Enumeratio (I: 220).

H. prolixus Stål (p. 443)

This is obviously a redescription by Gibson. Stål mentions none of the characters which appear on the redescription.

H. procerus Berg (p. 443)

Gibson gives a six-line "synopsis" of the original description and comments of Berg, thus boiling down about one and one-half pages of print, or some 70 lines! This "synopsis" is wholly wrong! Berg says the second segment of the antennae is "hardly shorter" than the third; the rostrum "passing the intermediate coxae," not, as Gibson has it, "beak extending beyond the metasternum." In the Spanish comments Berg flatly says: "It is distinguished from *H. serratus* Fabr. by the *entire* margins of the pronotum." Gibson directly states: "Lateral margins of the pronotum *strongly crenulate*." (Italics mine). Berg says "the prominent spined posterior angles" of the pronotum; Gibson "posterior angles broadly rounded." (There is a question here as to meaning of posterior angles. My understanding is that Berg meant the posterior angles proper, not the humeri; Gibson is apparently talking about the humeri in which case he is right.) In the membrane of the hemelytra, Berg says "two or three fuscescent stripes; Gibson, "an obsolete median fuscous line."

H. apicatus Stål (p. 444)

This is apparently a brief redescription by Gibson, from specimens so determined by him or by another. Except for the relative lengths of antennal segments II and III, none of the other characters is mentioned by Stål; Gibson omits the size as given in the original description—length, 5 mm., width, 2 mm.

H. serratus Fabricius (p. 444)

Here is another redescription. The original description is not available to me, but it is probably as succinct as other early descriptions. Fortunately, Stål cleared up nearly all the questions in Hemiptera Fabriciana. However, *H. perpunctatus* Dallas 1852, which was synonymized with *H. seratus* Fabricius by Stål, is said by Dallas to have "rostrum reaching the base of the abdomen"; Gibson says "not extending beyond the metasternum."

H. marmoratus Blanchard 1853 (et auctt. omnes, nec Spinola as says Gibson).

Another redescription, apparently with specimens in hand. It omits some of the characters given by Blanchard, but there is nothing contradictory in it. The same applies to *H. rhapimerus* Spinola 1853.

H. chilensis Dallas 1852 (*minor* Spinola 1853)

There is nothing in Dallas's description to controvert Gibson's redescription, which appears to be from specimens in hand, so determined. However, Spinola gives the length of the species as 2 lines (=4.2 mm.), but Gibson gives it as 7 mm., and Dallas as 3 lines (=6.3 mm.). This difference in size is puzzling, in view of the usually stabilized lengths in this group.

Note: According to Carlos Reed, Sinópsis de los Hemípteros de Chile, part II of the Dallas List antedates Spinola's part of the Fauna de Chile, since Dallas apeared in 1852, and Spinola not until 1853, or very early in 1854, whence *H. chilensis* Dallas 1852 has priority.

Elaborating on lost types and with special reference to the genus *Harmostes,* is this a valid generic name? Burmeister described the genus *Harmostes* quite recognizably in Handbuch, vol. II, p. 307, but he indicates no type species, following the custom of his times. He mentions 8 species in the Royal Museum, and then describes one of them under the name of *H. dorsalis.* He apparently designated no type specimen and there seems to be no such specimen extant; he also appears to have had more than one specimen before him, as he gives variation in length. The description of the species is so vague as to be practically a *nomen nudum.* But under rule 30c of the International Commission, this species *is* the type of the genus by original designation. As stated, it is unrecognizable by the description; hence the genus has no basis and apparently may be renamed. Subsequently, Gibson (1917) synonymized *dorsalis* Burmeister 1835 with *serratus* Fabricius 1794. Neither the Fabrician species nor any other than *dorsalis* is mentioned by Burmeister. Practically, the genus is founded *without* an included species and was not validated until Stål in 1862 (Hemiptera Mexicana) or in 1870 (Enumeratio Hemipterorum I: 220). In the first instance (1862), the first species mentioned is *Harmostes perpunctatus* Dallas 1852, which has been synonymized with *H. serratus* Fabricius 1794; hence this species might be construed to be the type of the genus. In the second instance (1870), the first species mentioned is *H. serratus* Fabricius 1794, which again might seem to be a designation under the first species rule. *H. dorsalis* Burmeister 1835 is mentioned unplaced at the end of this list in Enumeratio. Here again we might seem to have *H. serratus* Fabricius as the type.

To sum up and try to clarify this confused presentation of a confused question:

Burmeister in 1835 described the genus *Harmostes* (Hdbch II: 307), with only the one contained species, *dorsalis* (l.c.), which is unrecognizable from the description and of which no type specimen *appears* to be extant, so far as current information goes.

Dallas in 1852, in his key (List II: 520) again characterizes *Harmostes.* He named four species, of which the first is *H. virescens* Dallas 1852 (l.c.), synonymized by Stål (Enumeratio II: 220) with *H. reflexulus* Say 1831.

Stål 1862, in his key in Hemiptera Mexicana (Stett. Ent. Zeit. XXIII: 306) again set forth certain of the generic characters of *Harmostes.* The first species listed by him is *H. perpunctatus* Dallas 1852 (Stål, op. c. 321), which later (Enumeratio I: 220) he synonymized with *H. serratus* Fabricius 1794, the first species Stål mentions in his brief key.

Kirkaldy in 1901 (The Nomenclature of the Genera of the Rhynchota, Heteroptera and Auchenorrhynchus Homoptera, The Entom. XXXIV: 219) cites *Harmostes* Burmeister 1835, type *dorsalis* Burmeister 1835, without comment.

Van Duzee in 1917 (Cat., p. 117) lists *Harmostes* Burmeister 1835, haplotype *dorsalis* Burmeister 1835.

Gibson in 1917 (at a later date than Van Duzee) recharacterizes the genus *Harmostes* Burmeister 1835, refers to the impossibility of recognizing *dorsalis* Burmeister 1835, and synonymizes it to *serratus* Fabricius 1794, because the latter is the most widespread species. He then designated *H. serratus* Fabricius 1794 as the type of the genus.

There are then seven designations or recognitions of the type of *Harmostes* Burmeister 1835:

1. *dorsalis* Burmeister 1835 as the single species described or named in the genus.
2. Kirkaldy in 1901 *dorsalis* by direct designation.
3. Van Duzee in 1917 *dorsalis* by direct designation.
4. *virescens* Dallas 1852 (= *reflexulus* Say 1831) by first species rule.
5. *perpunctatus* Dallas 1852 (= *serratus* Fabricius) Stål 1862 by first species rule.
6. *serratus* Fabricius 1794 Stål 1870 by first species rule.
7. *serratus* Fabricius 1794 (= *dorsalis* Burmeister 1835) by Gibson 1917, by direct designation by synonymizing Burmeister's species with *serratus* Fabricius.

In order to clarify this complex situation two courses are open: either to select a type from among the earliest described species antedating Burmeister 1835, which leaves the selection from among *serratus* Fabricius 1794, *reflexulus* Say 1831 and *fraterculus* Say 1831; or to take as the type of the genus the first species named in the generic characterization next following Burmeister, which is *virescens* Dallas 1852 = *reflexulus* Say 1831.

In view of the fact that *serratus* Fabricius is probably the most widespread species, ranging from the United States into South America through Mexico, and that in one way or another it has been treated as the first species in addition to the fact that it is the oldest, I accept Gibson's designation of *Harmostes serratus* Fabricius 1794 as the type of the genus on the ground that *Harmostes dorsalis* Burmeister 1835 is a *nomen nudum* in the absence of type specimens; but not on Gibson's plea, by which he synonymizes *dorsalis* Burmeister with *serratus* Fabricius. Dallas's first species designation of *virescens* is rejected because of the apparently restricted distribution of the species, which does not seem to extend beyond the United States.

Note on *Harmostes propinquus* Distant 1881—Examination of the figure in Biologia Centrali Americana, Heteroptera I (pl. 15, fig. 19) shows that the insect figured there and described by color on p. 168 op. c., is clearly *not* an *Harmostes.* It is obviously nothing more than a color form of *Aufeius impressicollis.* I have specimens in my collection determined by the late Otto Heidemann as *H. propinquus* Distant, which are clearly nothing but *Aufeius impressicollis* Stål. Further, fig. 20 on the same plate is *not Aufeius impressicollis.* One obvious characteristic of the figure—the posterior femora but slightly incrassate and not spined—removes it from the Harmostini, in which the posterior femora are markedly incrassate and spined below. It cannot be *Aufeius* because it lacks the tribal characters above and also is without the generic characters of the much widened abdomen, the parallel costal margins of the hemelytra, and the distinct longitudinal median impression of the pronotum. Gibson, in his paper heretofore discussed, omits all reference to *H. propinquus* Dist. without comment. Van Duzee in his Catalogue has recorded it as a synonym of *A. impressicollis.* The synonymy is:

Aufeius impressicollis Stål 1870
=*Harmostes propinquus* Distant 1881

As to the species recorded by Distant, op. c. p. 169 and figured on plate 15, fig. 20 as *Aufeius impressicollis* Stål, it should be recorded as incertae sedis and left in suspense, in the absence of the original specimen, even though Distant states (p. 169): "The specimen figured is a typical one, in the collection of the Stockholm Museum." There is clearly a mistake somewhere; and labels sometimes get mixed, even in the best of Museums.

This further throws a great light on the idea held by certain entomologists that a figure is a necessary part of any description. Why should we imagine that a describer would be any more accurate in a figure than in a description in words? It has always seemed to me that each description should stand alone and be adequate to distinguish the species described from any other in the genus, even those as yet unknown. Likewise, it should so identify and segregate the species that it may be known at once, without reference to any given specimen, be it the type, or any other. If a species may be known *only* from the type specimen and by comparison *with* the type specimen, why not simplify descriptive entomology and save time, effort and paper, in this wise: "*Novus novissimus* Ignoramus n. sp.—Agrees in every particular with the type no. 7,000,001½, Museum of Universal Knowledge, Hula-Hula, Watling Island."

Of course, this is far-fetched; of course this is ridiculous; of course, this is absurd. But there is not an entomologist who has not seen descriptions that are as like to this as two peas.

CASTING UP ACCOUNTS.

Directed to Authors.

It is advisable to cast up accounts every now and then, to see where one stands. The BULLETIN and ENTOMOLOGICA AMERICANA have done so; and we have surveyed the authors who favor us with their excellent papers, and the conditions surrounding these. We find we have blinded ourselves to some aspects of our rules. We also find that in consequence it becomes obligatory to guide ourselves more strictly by certain of these; and we now bring them pointedly to the notice of our authors.

Both our journals are devoted to the U. S. Fauna so far as possible, so, until such a time as conditions improve, we will not be able to accept anything on other Faunas. We also have a principle to give first preference to articles by our own Society members, and second by our subscribers. Owing to space limitations, we are compelled to adhere strictly to this, hence for the time being papers by others can be accepted only on condition that they await their turn.

We are further compelled to publish *no* plates or cuts, except at the author's expense. We will charge these at cost to us.

Likewise, no tabular matter will be accepted for publication from *anyone,* unless the author defrays the added cost.

Our rule for gratis reprints of Bulletin articles will also be strictly carried out—25 free reprints of articles *not less than* one (1) *full* page or more in length will be furnished authors, but only if they indicate their wishes *before* the page proof is accepted; NO gratis reprints for notes less than one (1) full page. If wanted, and ordered beforehand, such notes will be charged for at cost to us, plus 10%.

Attention is drawn to the fact that NO gratis reprints are furnished of articles in ENTOMOLOGICA AMERICANA. This journal is costly and *run at a loss.* We are in consequence, and greatly to our regret, compelled to make certain conditions in regard to such articles. These are: 1—Authors will agree to take a minimum of 50 reprints; 2—authors will pay for all plates and cuts; 3—the price for reprints is set at one and one-half (1½) cents per page per copy, for example, 40 page reprints will cost authors 60¢ each, plus the total cost of the plates.

We want our authors to feel assured that it goes very much against the grain with us to be forced by circumstances into this seemingly arbitrary position. We do it under compulsion of conditions beyond our control.

J. R. DE LA TORRE-BUENO, Editor.

BOOK NOTES.

Entomophagous Insects, by Curtis P. Clausen. Pp. i–x + 1–688, figs. 1–257. McGraw-Hill Company, Inc., New York, N. Y. 1940. $7.00.

It is, of course, not possible in our limited space to make an extended critique of this important work on predacious insects, and we must restrict ourselves to pointing out its excellence and its content in general language.

The book is not divided into formal chapters. It carries a brief Preface in 2 pages and an introduction in 2 pages under the head Entomophagous Insects covering generalities. The succeeding sections are headed with the names of the Orders in regular rotation. Under each general title, the Orders receiving extended treatment are set forth in the order of the families in each. As is to be expected from Dr. Clausen's chief field of research, half the work (340 pages) is devoted to the Hymenoptera; the Diptera follow with 142 pages; then the Coleoptera and Strepsiptera with 96 pages, and the Lepidoptera with 13. The remaining 29 pages of text (exclusive of 49 pages of References and 28 pages of Index), are occupied with the 11 other Orders under consideration.

Of these 29 pages, 6 only are concerned with the Heteroptera (termed Hemiptera by Dr. Clausen). This reviewer is not sufficiently familiar with the other neglected Orders to pass a valid judgment on their treatment, but some 40 years of field-work and study have given him some insight into the biology of the Heteroptera, hence the following comment. *Geocoris* in various species is a known predator on *Nysius,* but it is mentioned only as attacking the European red mite. Any number of the family Lygaeidae have been recorded as predators by H. G. Barber. But a Fijian species is the only other cited as entomophagous. In the Nabidae, there are records of their activities as predators all through the American literature. Only *one* American genus is mentioned in the Anthocoridae, *Orius insidiosus;* there is no mention of my own two records of *Anthocoris musculus* Say as abundant on hops infested with plant lice, and in the webs of *Tetranychus telarius* on beech. (Incidentally, *Acanthocoris nemoralis* there mentioned is correctly *Anthocoris;* the first genus is in the Nabidae.) In the Reduviidae, all the species mentioned are exotic. Yet, it is well-known that our own native reduviids are highly entomophagous, for example the tree-dwelling *Acholla multispinosa* DeG., *Sinea diadema* Fabr. and the North American species of *Zelus* (NOT *Zellus* as Dr. Clausen has it). He makes mention of the gummy legs in two exotic reduviids, but not the recorded observations on our own common Zelinae. Nor is sufficient stress laid on the highly predacious character of our northern species of Phymatidae, commonly known as bee-killers. All the concrete instances preceding are cited without referring to the enormous literature in my hands on the American Heteroptera. This deficiency is easily explained by consulting the References. Of the many American hemipterists of standing not one is mentioned, not even Uhler and Van Duzee! The Europeans and the economic entomologists appear to have been the only sources of information on the Heteroptera, and even here, we miss Distant's Fauna of British India, Heteroptera. This defect in an otherwise invaluable work may easily be overcome by proper cooperation with our own American authorities. Certainly, no one can hope to know all about *every* Order.

In the Orders more extensively treated, this work is a truly splendid contribution, indispensable to every student of insect bionomics.

Plant Galls and Gall Makers, by Ephraim Porter Felt. Pp. i–viii + 1–364, pls. 1–43, figs. 1–344. Comstock Publishing Co., Ithaca, N. Y. 1940. $4.00.

Perhaps there is no better way to start this note than by quoting from Dr. Felt's Preface: "This book is planned to give a general idea of the immensely interesting and comparatively unknown insect galls and their producers and to facilitate the identification of the hundreds of these deformities occurring upon numerous plants in all parts of North America."

I suppose no one who has roamed the fields and woods has failed to notice the strange warts and growths on trees and bushes and herbs, such as the pine-cone willow gall, or the ordinary round gall on golden rod stems, or the ever-present oak-apples, all produced by insects. And here in the so-called Arizona desert, we see a little spiny growth on creosote bush (*Larrea divaricata*), not mentioned by Dr. Felt, incidentally, which seems to be produced by a jumping plant louse. In these galls, the work of insects, their young develop and mature.

In his introduction Dr. Felt speaks of the types of galls, of the principal insects that produce them and how, of their economic importance, and ends by telling how to collect them and how to rear the contained insects. In part II he takes up the 2000 or more galls he treats of by plant families.

The most conspicuous of the plant-galls are the so-called oak-apples, which are an important source of tannin for various purposes. In past years, the oak-apples from Turkey, called among other trade names Aleppo galls, were the principal constituent of writing ink, and they are used even to this day in making permanent black inks. Everyone has seen letters and other writing grown rusty with the passing of years. This faded old handwriting may be restored to blackness by passing a hot iron over them. Galls are practically coextensive with the plant kingdom—even cacti have them, as well as roses and knot-weed.

As is commonly known, plant galls are caused principally by Hymenoptera and Diptera, although a few species in other Orders also cause them.

In Part II the galls are briefly described and sometimes keyed out by their characteristics and their host-plants, with very fine line drawings of representative types. The 41 plates reproduce photographs of 369 types of galls.

There is a short Bibliography of about one and one-half pages, giving only references subsequent to Dr. Felt's Key to American Insect Galls, published by the New York State Museum in 1918 (Bulletin #200). An extensive Index of 24 pages gives the genera and species of insects, and of galls, by their common names.

The author's reputation as our leading authority on galls and gall insects makes this work authoritative, as well as the most modern on the subject. *Plant Galls and Gall Makers* is emphatically a book for the botanist as well as for the entomologist. Notwithstanding, it is so free of the turgid technicisms of either science, that the nature student will find it easy to understand and a fascinating source of information on these strange, and sometimes weird looking, plant growths.

A New Locality for Cantharis Cartwrighti.—Among the Cantharidae which were identified for me by Mr. J. W. Green, there were two specimens of the recently described *Cantharis cartwrighti* Green, which I took at Lake Hopatcong, New Jersey (June 9, 1940). This is rather an interesting record as this species was heretofore known from Black Mountains, N. C., and Detroit, Mich. As the range of this species seems to be quite extended, it may be expected that this Cantharid will be found in other places.—BORYS MALKIN, New York City.

PROCEEDINGS OF THE SOCIETY.

(Continued from p. 44.)

Mr. Teale showed many pictures of the praying mantis at all stages, including a series of the female devouring her mate. This large insect is one of the easiest to potograph. It, or one of the large silkworm moths,—such as the Luna, Polyphemus, Promethea or Cecropia,—provide good subjects for the beginner in insect photography.

The meeting adjourned at 10:00 P.M.

Carl Geo. Siepmann,
Secretary.

Meeting of April 11, 1940.

A regular meeting of the Brooklyn Entomological Society was held at the Brooklyn Museum on Thursday evening, April 11, 1940. President William T. Davis presided, and ten other members were present, namely, Messrs. Buchholz, Engelhardt, Gaul, Malkin, McElvare, Moennich, Sheridan, Siepmann and Teale; also Dr. Alexander B. Klots and Mrs. Klots, and Messrs. Arnold Goldberg, Gaylord C. Hall, Bostwick H. Ketchum and W. Pfeffer.

The minutes of the previous meeting were read and accepted. Mr. Engelhardt, reporting as treasurer, said that the Society had no bills outstanding, and that the books showed receipts of $1872.97 and disbursements of $1251.88 since Jan. 1, 1940, leaving a cash balance of $621.09.

Mr. Davis said that the first butterfly he had seen this year was a cabbage butterfly, at St. George, Staten Island on April 7.

The speaker for the evening was Dr. Alexander B. Klots, who spoke on the subject of Arctic-Alpine Insect Distribution in the Rocky Mountains.

Dr. Klots said that the field of insect taxonomy is so large, and with so considerable a literature, that it is necessary for the student to specialize. The taxonomy of the past was based on inadequate series of specimens, and conclusions regarding the habitat, range and definition of species was based upon a mere sprinkling of material from scattered collecting points. But today, lack of transportation no longer makes it difficult to obtain material in a specialized group from a representative number of localities throughout its range. Cars, good roads, and even the airplane have made the most remote regions accessible.

In his studies, Dr. Klots has narrowed himself to two genera of butterflies, *Colias* and *Brenthis,* and one genus of moths, *Crambus.* By concentrating on these groups and collecting wherever possible throughout their range, a good idea of the distribution of the various species can be obtained, and many facts and ideas that were previously at most suspected, can be substantiated. This brings the realization that what have been considered distinct species are in many cases only varieties of a few large and widely distributed species.

The groups in which Dr. Klots specializes are representatives of the holarctic fauna, which in its broadest sense, includes the species of the northern regions of both the Old and the New Worlds, and the species extending southward into the alpine regions of mountain ranges. The holarctic fauna was pushed to the south by the glacier, and when the glacier receded, the fauna followed it northward in both hemispheres, while parts of it were isolated in the mountain ranges of both continents. Groups restricted to high altitudes thus become isolated on mountain tops without occurring in the intermediate regions. This complete isolation in a given mountain range makes the arctic-alpine fauna of especial interest to the student of subspecies.

New Hampshire and Mt. Katahdin (Maine) have small areas above timberline, and the species representing glacial remnants are few. There is nothing that compares with the extensive Rocky Mountain alpine fauna. The Californian mountains, too, for some reason, in the Lepidoptera at least, likewise have little arctic fauna worth mentioning. It is possible that when the glacier receded, a natural barrier may have prevented these forms from reaching California.

Several genera of Lepidoptera have an arctic-alpine distribution. *Oeneis,* of the Satyridae, above all, is an arctic-alpine genus. One group of this genus occurs in the Canadian zone of coniferous forest. Another, whose species are usually darker in color, embraces the most arctic-alpine of all butterflies, occurring only above timberline. *Semidea* and *katahdin,* occurring in New England, are really subspecies of two widespread arctic species.

In *Erebia,* also of the Satyridae, there is the same trend as in *Oeneis.* One species, *epipsodia,* occurs in the lowlands; all the others occur at or above timberline. *Erebia magdalena* occurs in the most impossible situations on the great rock slides. A thorough monograph of the species of the World has been published, and this is the most thoroughly worked up of all the holarctic genera.

Parnassius, of the Papilionidae, has a very wide, and a mixed distribution. Arctic and alpine forms occur, as well as forms that come down as low as the sagebrush regions. Because of its wide distribution and range of habitat, it is not nearly as interesting a genus to the student of subspecies, as complete isolation of forms at high altitudes is unlikely.

In *Colias, hecla, palaeno* and *nastes* represent purely arctic species occurring to the north of timberline, but they do not occur above timberline on mountains. They are arctic, but not alpine. *Colias pelidne* and *gigantea* occur in the arctic and in the northernmost alpine regions. *Gigantea,* until recently, was not known to occur south of Ft. Churchill or the Riding Mountains in Manitoba, but this summer Dr. Klots obtained a series in the Wind River Range, Wyoming, which is undoubtedly a subspecies of *gigantea. Pelidne* is another species which reaches its southernmost distribution in the Wyoming mountains.

Colias christina, occidentalis and *interior* reach as far south as Wyoming, Northern California and New York, *christina* even occurring in Utah, but they occur at somewhat lower altitudes than the preceding species. *Colias chrysotheme* is an abundant and widespread species of the palaearctic region, and if series from Europe and Siberia are compared with our common *eurytheme* and *philodice,* it is seen that they, too, are races of *chrysotheme.*

Colias alexandria occurs almost as far south as *eurytheme,* but it does not occur further north than southern Canada.

Colias behri is an endemic species limited to a small range in the California mountains, and *harfordi* and *scudderi* are two localized species occurring at somewhat lower altitudes in the same state and Colorado respectively.

In *Brenthis* the same distribution pattern occurs as in *Colias.* There are the extreme arctic species, as *chariclea, improba* and *polaris.* Some varieties of *chariclea* described from southern Canada are not this species. *Pales,* hitherto considered a palaearctic species, occurs all over northern Europe, central and northern Asia. It has not penetrated far into North America, not having been found east of the McKenzie Delta. Recently, however, a subspecies has been taken in the Wind River Range of Wyoming.

Brenthis bellona of the eastern states, and *epithore* of California, are offshoots of *friga,* but both are distinct species.

Colias and *Brenthis* are represented in South America, but there the species have been so long isolated from the northern groups of the genera, that they are very different in general appearance.

Dr. Klots showed lantern slides of the Rocky Mountain Regions where he had collected, and motion pictures in color of the Wind River Range of Wyoming.

The meeting adjourned at 10:00 P.M.

CARL GEO. SIEPMANN,
Secretary.

MEETING OF MAY 16, 1940.

A regular meeting of the Brooklyn Entomological Society was held at the Brooklyn Museum on Thursday, May 16, 1940. Mr. William T. Davis presided, and eleven other members were present, namely, Messrs. Buchholz, Dietz, Engelhardt, Gaul, Malkin, McElvare, Moennich, Naumann, Shoemaker, Siepmann and Teale; also Miss Dietz and Messrs. Irving Ehrenreich and Arnold Goldberg.

The minutes of the previous meeting were read and accepted. Mr. Engelhardt reported as treasurer and read a letter from the editor. Mr. Engelhardt proposed for membership: Mr. Fred T. Naumann, 94 Harrison Street, East Orange, New Jersey. The by-laws were suspended and Mr. Naumann was duly elected to membership.

Mr. Engelhardt reported as delegate to the Eighth American Scientific Congress in Washington.

A specimen of *Lemonitis orthemus,* dark form *chrysopina* was shown by Mr. Shoemaker.

Mr. Albro Tilton Gaul showed photomicrographs of the embryological development of the hornet, *Vespula maculifrons.* The specimens were preserved in formaldehyde, dehydrated, impregnated with paraffine and cut with a microtome. A Bausch and Lomb K camera was used in conjunction with a Spencer microscope. Exposure was two minutes with a 16 mm. objective and 15 minutes with a 4 mm. objective, using paniprocess film and a yellow filter consisting of a bottle of saturated picric acid.

Mr. Davis said that there are some species of Orthoptera that can be distinguished only by their song. He also mentioned that in the Bombylid flies, a species was observed, which, in some cases, had a long period, and in others a short period, and that later the two forms were found to be distinct species differing by minute structural characters. Mr. Engelhardt added that some species of Lampyridae can be distinguished only by their flash.

Mr. McElvare showed two books of interest to entomologists, "Laboratory Guide to Entomology" and "Handbook of Range

Plants," the latter published by the Forest Service, United States Department of Agriculture.

Mr. Engelhardt said that he had found evidence of work of a bark borer in the sourgum, *Nyssa sylvatica,* in Washington, D. C. The borer attacks abused trees in the outskirts of the city. On his last trip to Washington Mr. Engelhardt obtained two fairly well grown larvae, which he hoped to breed through, although they were taken rather early in the season.

Mr. Davis noted that Brood XIV of the seventeen-year locust will appear this summer in great numbers at the Half Way Hollow Hills, Long Island.

The meeting adjourned at 9:45 P.M.

CARL GEO. SIEPMANN,
Secretary.

MEETING OF OCTOBER 10, 1940.

A regular meeting of the Brooklyn Entomological Society was held Thursday evening, October 10, 1940. The meeting was called to order by President William T. Davis at 8:40 P.M. Those in attendance were, members: G. P. Engelhardt, Otto Buchholz, Borys Malkin, E. W. Teale, R. McElvare, H. J. Dietz and A. T. Gaul; visitors: Mr. A. M. Dezolt, J. Kremer, C. H. Ragot, and Miss B. M. K. Dietz.

The treasurer rendered a satisfactory report, and read a communication from the Editor of the BULLETIN and ENTOMOLOGICA AMERICANA.

The subject of the discussion was the summer experiences of the members. Mr. Dietz reported a very poor season in collecting *Catocalas.* He found *Argynnis cybele* abundant in mid-July at Weston, Conn.

Mr. McElvare found collecting on Long Island very poor. His collecting at Southern Pines in the Smokies was quite good in June and along the Florida Keys in September. He found *Stagmomantis carolina* very common. He also believes that *Eupanychis spinosae* may pass its larval life in the seed heads of the yellow aster; adults are frequently found flying about this plant, and he discovered a larva in the seed heads that may turn out to be that of *Eupanychis.*

Mr. Teale reported some observations in the sand dune country of Indiana. One interesting note was made on a gash in an oak tree which attracted several species of insects that utilized the sap; in particular Mr. Teale noted a red admiral (*Pyrameis atalanta*) which consistently chased *Vespula maculata* workers from the gash by threatening them with her wings. This bluff seemed very effective.

Mr. Teale also showed a beautiful set of pictures of the life history of a species of *Microcentrum* (Locustidae). He further reported observing a hundred or more individuals of *Bombus impatiens* which slept for several nights in the crevices in the bark of the same red oak tree. All the specimens shown were males of *B. impatiens.* He also presented specimens and photos of *Diapheromera femorata,* the walking stick.

Mr. Malkin showed some weevils collected from parts of New York and New Jersey. Of particular interest was *Calomycterus setarius* Roecla, a weevil imported from Japan about 1930 and now quite common. Mr. Malkin also showed a box of *Carabus* and *Calosoma* beetles from Europe.

Mr. Ragot demonstrated a series of Cicadas from South America.

He reported finding Staphylinid beetles following regular paths similar to ants on a fungus-infected tree trunk at High Point, N. J. He also mentioned *Meloë angusticollis* as being particularly abundant on thistles.

Mr. Engelhardt reported on his work on the Aegeriidae.

Mr. Gaul showed some Ichneumons and some Chalcidoid hyperparasites.

The meeting adjourned at 10:00 P.M.

Albro Tilton Gaul,
Secretary pro tem.

Meeting of November 14, 1940.

A regular meeting of the Brooklyn Entomological Society was held at the Brooklyn Museum on Thursday, November 14, 1940. President William T. Davis called the meeting to order at 8:15 P.M. Seven other members were present, viz., Messrs. Buchholz, Gaul, McElvare, Malkin, Naumann, Siepmann and Teale, and five visitors, Messrs. A. M. Flaherty, I. Earl Ehrenreich, John C. Pallister and Rutherford Platt, and Mrs. Pallister.

The minutes of the two previous meetings were read and approved.

Mr. Davis showed specimens of the hornet, *Vespa crabro,* and described the observations made by Mrs. Karl Pauli, of Staten Island, concerning its habits. She found the hornets gathering the living wood of the lilac for its nest. She also saw them catch the Monarch butterfly in flight, and bite off the wings. Mr. Davis remarked that it was strange that *Vespa crabo,* a species introduced from Europe, is found mostly in the metropolitan region, and has not spread considerably into the outlying parts.

Mr. McElvare showed a clipping from the *New York Times* of November 8, 1940, in which Mr. William T. Davis was reported as one of nine individuals and organizations honored by the Park Association of New York City with citations of merit for outstanding service to the parks of New York City. According to the *Times,* "Mr. Davis's citation paid tribute to his knowledge of plant and animal life, and to his influence during most of his 78 years in bringing to the public an appreciation of the needs and meaning of parks."

Mr. Edwin Way Teale showed photographs of honey bees, most of which appeared in his recent book, "The Golden Throng," and showed two reels of Kodachrome motion pictures of insects. Among the subjects filmed were:

Cicadas emerging from their pupal cases, taken at the Half Way Hollow Hills, Long Island, where brood XIV occurred this year.

Cicada killers stocking their burrows, taken on Staten Island. During the course of the picture, one of the big wasps is seen interfering with another bringing a cicada to its burrow. Mr. Davis said he had never seen this happen before.

Ants tending aphis. At one point a syrphid fly can be seen flying in among the aphis.

Praying mantes emerging from their egg mass, hanging down in long strings.

The four stages in the life cycle of the *Cecropia* moth.

The digger wasp preparing a burrow. The wasp was shown bringing the dirt from its burrow, and spreading it out with its rear legs. After each load the wasp would clean her antennae. Upon completion of the burrow, the insect went abroad in search of grasshoppers, with which she stocked her burrow. Once, while the wasp was out, a leaf was placed over the hole. When the wasp returned, she soon located her burrow, and flew away with the leaf, depositing it some distance away.

Thalessa lunator, boring into a log. First the insect was seen running over the surface of the log in search of a place to drill, probing every likely crevice with her antennae. When a satisfactory place was found, she threw her ovipositor in an arch over her body, and drilled into the log. After the operation was completed, she cleaned off her long ovipositor in a manner suggesting a violinist drawing a bow.

The meeting adjourned at 10:15 P.M.

CARL GEO. SIEPMANN,
Secretary.

EXCHANGES

This one page is intended only for wants and exchanges, not for advertisements of articles for sale. Notices not exceeding THREE lines free to subscribers. Over lines charged for at 15 cents per line per insertion.

Old notices will be discontinued as space for new ones is needed.

DIURNAL LEPIDOPTERA.—Have many desirable western species to exchange, including *Argynnis atossa, macaria, mormonia, malcolmi, nokomis; Melitaea neumoegeni; Lycaena speciosa;* etc. Send lists. Dr. John A. Comstock, Los Angeles Museum, Exposition Park, Los Angeles, Calif.

BUY OR EXCHANGE: Pinned Microlepidoptera and papered Pieridae of North America. Full data with all specimens. Named material of all groups offered. Alexander B. Klots, College of the City of New York, New York City.

EXCHANGE OR FOR SALE.—*Catocala herodias* (Gerhardi), *Graptolitha viridipallens* and others. Wanted: Rare N. A. Macro-Lepidoptera. F. Lemmer, Lakehurst, N. J.

WANTED.—North American CHRYSIDIDAE for exchange or determination, with privilege of retaining duplicates. W. G. Bodenstein, Dept. Entomology, Cornell University, Ithaca, New York.

PENTATOMIDAE: Want to buy or exchange Petatomidae from the United States and Mexico. Herbert Ruckes, College of the City of New York, 17 Lexington Ave. N.Y.C.

ACALYPTRATE DIPTERA OF THE WORLD wanted for determination or in exchange for other insects. Geo. Steyskal, 23341 Puritan Ave., Detroit, Mich.

LOCALITY LABELS.—3½ or 4 point type; 40c per five hundred, 60c per thousand, 40c for each additional thousand, same type. Type labels on colored paper 10c extra. Good paper, clean work, no trimming. The Nature Co., Box 388, Lawrence, Kansas.

LEPIDOPTERA COLLECTION.—Excellent condition, fine representation of named N. A. Diurnals and Nocturnals. Also choice selections of tropical Papilios, Sphingiids and Saturniids. Hy. J. Dietz, 3053 Hull Ave., New York, N. Y.

Vol. XXXVI JUNE, 1941 No. 3

BULLETIN

OF THE

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The Brooklyn Entomological Society

Meetings are held on the second Thursday after the first Tuesday of each month from October to June, inclusive, at the Central Museum, Eastern Parkway and Washington Ave., Brooklyn. The annual dues are $2.00.

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BULLETIN

OF THE

BROOKLYN ENTOMOLOGICAL SOCIETY

Vol. XXXVI June, 1941 No. 3

CONCERNING NEIDIDAE, WITH NEW SPECIES AND NEW RECORDS FOR NORTH AMERICA.

By H. M. Harris, Ames, Iowa.

The following records are based partly on specimens in the collections at Iowa State College and partly on specimens belonging to the University of Kansas. For the privilege of studying these latter I am much indebted to Doctors R. H. Beamer and H. B. Hungerford.

Aknisus multispinus (Ashmead).

I have seen a long series of this not uncommon little stilt-bug from New Jersey, Florida, Mississippi, Alabama, Louisiana, Iowa, Kansas, Texas, and Arizona.

Jalysus elongatus Barber.

I took a pair of this nice species in the S. Cruz Valley, south of Tuscon, Arizona, Aug. 15, 1937. The species is known only from that state. In one specimen (male) the process on the vertex is straight and directed obliquely upward and forward, while in the other (female) it is sharply deflexed. The male genital capsule is transversely sulcate just below the apical margin which is distinctly sinuate.

Jalysus spinosus (Say).

Many specimens of what I recognize as *spinosus* (Say) are at hand from Mississippi, Tennessee, Arkansas, and South Carolina. I have three specimens from Iowa and have seen a specimen from Connecticut. In this form the genital capsule of the male is distinctly, transversely sulcate just below its apical margin. The antennal segments of the female are proportionately shorter than in the male.

Jalysus wickhami Van Duzee.

A very long series is at hand from California, Oregon, Washington, British Columbia, Idaho, Arizona, Nebraska, South Dakota,

JUN 28 1941

Iowa, Tennessee, Arkansas, Mississippi, Louisiana, Michigan, Ohio, Pennsylvania, Virginia, Georgia, and Texas.

This form has been much confused in the literature with the above very closely related one and some workers have been inclined to consider them identical, while others would recognize *wickhami* as a variety of Say's species. In the three hundred and more examples before me the male is readily recognizable by the nature of the genital capsule, the hind edge of which is thicker and stronger than in *spinosus* and more conspicuously, rectangularly excised. Furthermore, there is a faint though distinct, pale, median longitudinal carina which is confluent posteriorly with the slightly swollen posterior margin. The transverse sulcus that extends across the capsule in *spinosus* thus is not present in *wickhami.* The capsule is, however, shallowly impressed on each side. As pointed out by Van Duzee and McAtee the pronotum is more distinctly carinate down the middle and the antennal segments are shorter than in *spinosus.* The apical antennal segment is also in general noticeably stouter and the first rostral segment shorter. In *spinosus* males the distal three antennal segments, of a series measured, are in the following proportions,—48 : 65 : 26. In *wickhami,* the proportions are,—39 : 52 : 22.

Jalysus balli, n. sp.*

> Closely related to *Jalysus spinosus* (Say) and *Jalysus wickhami* Van Duzee and agreeing with them in size and color. Head slender, the sides impunctate before and behind the eyes. Antennae brownish testaceous, the extreme apices of the first three segments and base of fourth pale, segment IV fuscous, its apical fifth white; proportion of segments (male), 80 : 40 : 48 : 24. Pronotum coarsely punctate, with prominent median and lateral carinae, the humeri swollen, the anterior lobe more distinctly flattened and the posterior lobe more steeply arched than in *wickhami.* Legs colored as in *spinosus* and *wickhami.* Ostiolar spine short, pale. Scutellar spine moderately long. Mesothorax with a prominent, rounded, pale callosity on each side above the acetabulum. Genital capsule of male much like that of *wickhami,* but the pale margin thinner and sinuate. Claspers not so broad as in *wickhami.* Length: male, 6.35 mm.; female, 7.20 mm. Width: 0.80–1.00 mm.

Holotype, male, and *allotype,* female, Patagonia, Arizona, August,

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*(*Note:* This species is unquestionably very close to *J. reductus* Barber, the description of which has appeared in print since this manuscript was sumbitted for publication in May, 1939.)

16, 1937, H. M. Harris (author's collection). *Paratypes,* one male and two females, taken with types: one male, San Antonio, near El Salto, Mexico, June 10, 1937, Meldon Embury; and one male, Matzorango, V. C., Mexico, Feb. 11, 1892, Herbert Osborn.

This form is dedicated to Dr. E. D. Ball who spent two days with me at his favorite collecting sites in south Arizona. It is somewhat intermediate between the nearctic species and the species heretofore known from the neotropical regions. From the former it is recognized by the impunctate sides of the head; from the latter by the non-speckled legs and antennae. One of the specimens from Mexico has the antennal segments slightly longer than in the Arizona examples.

Jalysus tenellus (Stål).

Several examples of a form that I refer tentatively to Stål's species are present from Southern Texas. These were taken in Cameron County and at Brownsville by Doctor Beamer and his colleagues in August 1928, and June 1938. In these specimens the legs and basal antennal segment are conspicuously speckled with black and the distal antennal segments are dark with pale apices. The ostiolar spine is pale. The head is impunctate on the sides and the pale callosity above the mesothoracic acetabulum is quite conspicuous. The genital capsule of the male is transversely impressed below the distal margin, which is deeply excised on either side of the middle so that it is trilobate.

Jalysus tenellus (Stål) was originally described from specimens taken at Puna (near Guayaquil, Ecuador). Distant has recorded it from Mexico, Panamá, Brazil, and Argentina. In addition to the above specimens, which are the first records for the United States, I have examples from Costa Rica.

Berytus minor (H. S.).

The University of Kansas possesses a specimen of this European form taken by Dr. Hungerford, in Cheboygan Co., Michigan, Aug. 4, 1933. The specimen differs in no way from European examples in my collection. This apparently is the second record of the occurrence of the genus *Berytus* on this conitinent.

Pronotacantha annulata Uhler.

I took a long series of this form at Peach Springs, Arizona, Aug. 10, 1937, and the University of Kansas possesses a nice series, taken by Dr. Beamer at a point 65 miles south of Marathon, Texas. Specimens also are at hand from Zion National Park, Utah; and Indio, California.

Protacanthus decorus Uhler.

Specimens are at hand from St. Vincent, West Indies; Mandeville, Jamaica; Columbia, South America; and in the United States a nice series taken by Dr. Beamer at Brownsville, Texas, July 3, 1938, and Cameron County, Texas, Aug. 3, 1928.

Acanthophysa echinata Uhler.

In his very valuable study of the nearctic genera and species of the family Neididae (Jour. N. Y. Ent. Soc., 27: 79–92, 1919) McAtee pointed out that his *Saurocoris instans* might possibly be the macropterous form of *Acanthophysa echinata* Uhler. Field observations during the past two seasons and a careful study of both macropterous and brachypterous forms taken together near San Bernadino, California and in Arizona only serve to confirm Van Duzee's opinion (Pan-Pacific Ent., 5: 166, 1929) that this actually is the case. Furthermore the discovery of a second species discloses that it too exhibits the same type of pterygomorphism. *Saurocoris* McAtee therefore must be suppressed as synonymous with *Acanthophysa* Uhler. Many specimens have been seen from Milford, Utah; Antioch, Lucerne, Mt. Diablo, Auburn, Monrovia, Dunsmuir, Jamesburg, Lemon Cove, Eureka, and Lake Arrowhead, California; Atasco Mts., Sta. Catalina Mts., Nogales, and Mt. Lemmon, Arizona; Hood River, Oregon; and Cliffdell, Washington. There is, as is to be expected, some variation in the size of the spines, and in the distinctness of the annulations on the appendages. The lateral edge of the posterior lobe of the pronotum is beset with five long spines. Antennal proportions: (brachypterous), 65:25:52:15; (macropterous), 80:30:60:18.

Acanthophysa idaho, n. sp.

Stramineous, the spines paler, the legs and venter distinctly greenish in recently caught specimens. Antennae indistinctly annulate, the enlarged apical joint black; proportions, 55:17:45:18. Legs finely annulate with brown, the enlarged distal portion of femora and the tarsi brown.

Head with five antrorse curved spines on median line, and with spinules and low carinae near eyes as in *echinata* Uhler. Pronotum with spines on front margin, lateral margins, and disc of front lobe as in *echinata;* the posterior lobe with a median row of spines but unarmed between it and lateral row. Scutellum and hemelytra armed as in *echinata,* and arrangement of veins and membranes as in that species. Venter with numerous fine tubercles, each of which bears a short seta. Ostiolar process slender, slightly curved posteriorly. Length 2.8–3.4 mm.

Macropterous form: General color and markings and armature of head, pronotum, and scutellum as in brachypterous form. Antennal proportions, 65:20:55:16. Hemelytra whitish hyaline, the corium, except outer margin, with only a few short spines; the juncture of marginal and terminal veins of corium far cephalad of end of abdomen. Membrane broad, well developed and extending much beyond end of abdomen. Length, 4 mm.

Holotype, brachypterous male, and *allotype* brachypterous female, Grangeville, Idaho, June 20, 1938, H. M. Harris; author's collection. *Morphotype,* macropterous female, Lacomb, Oregon, May 21, 1933, K. Gray. The Idaho specimens were found on the ground, around grass-roots, on a hillside. The species, while close to *echinata* Uhler, appears to be readily identifiable by the single row of spines on the disc of the posterior lobe of the pronotum as well as by the shorter appendages and the different antennal proportions. In both species the disc of posterior lobe is limited in front by a transverse row of spines, the central three of which are prostrate and directed anteriorly. In *echinata* the first antennal segment is subequal to III and IV combined and less than three times as long as II. The macropterous form of that species, like *idaho,* has longer antennae than does the brachypterous form.

Two Neotropical Polistes Imported with Bananas.—Among some wasps recently received from Mr. R. R. Dreisbach, and belonging to the Museum of the University of Michigan, there are three females of *Polistes canadensis* var. *erythrocephalus* Latreille, labelled "Cheboygan Co., Michigan, July 1932; nest in bunch of bananas. (H. B. Hungerford)." This is a characteristic wasp of Nicaragua, Costa Rica, Panamá and Colombia. (See J. Bequaert, 1940, Jl. New York Ent. Soc., XLVIII, p. 10). Last summer Mr. R. A. Flock showed me several females of *Polistes instabilis* de Saussure, which he had taken January 1, 1940, in a store at Tucson, Arizona, from a bunch of bananas, presumably imported from southern Mexico. *P. instabilis* is very common in Mexico, where I know it from the States of Tamaulipas, San Luis Potosi, Vera Cruz, Hidalgo and Guerrero, and I have also taken it in the Republic of Honduras.—J. BEQUAERT, Museum of Comparative Zoölogy, Cambridge, Mass.

COURTING ANTICS OF A ROBBER FLY.[1]

By F. C. Harmston and G. F. Knowlton, Logan, Utah.

Courtship antics of the asilid fiy, *Cyrtopogon willistoni* Curran, were observed in Logan Canyon on July 14, 1940. The attention of the writers' was first attracted to this interesting behavior at approximately 1 P.M., while collecting along a small, grassy mountain stream. The females of this fly were first observed as they actively pursued and captured specimens of the large, awkward crane fly which was present in abundance among the tall grass.

The female *willistoni* would alight upon a rock or other object and begin feeding upon her prey. While thus engaged, one male or in some cases two males, would approach and courtship would occur. The male would remain nearly motionless on hovering wings, directly in front of the face of the female, usually about two feet away. The high-pitched hum of the wings was audible at a distance of five or six paces, calling attention to this activity. The fore tarsi of the males were vibrated in a vertical plane, and in the bright sunlight they appeared as a silvery fan. The middle legs hung outward and downward from the body; the last two joints being conspicuously enlarged, appeared as knob-like structures on the tip of the middle legs and described small circular movements on each side of the body. The posterior legs hung limply downward from the body.

The male would slowly approach the female, its wings continuing to produce the same high-pitched hum, its legs performing peculiar movements in front of, and at the sides of the body. When the male had moved near her, usually to within about 10 inches, the female would make a quick dart toward him, whereupon the male would discontinue his strange antics and alight upon a nearby object, always facing the female and watching her closely. In several instances a second male, upon approaching the courting pair, would be set upon by the first male and quickly driven away. Although a female often would attack the courting male when he approached her closely, in no such instance was she observed to discard her prey. Actual copulation was not seen to take place among any of the several pairs of flies observed at various times throughout the afternoon.

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[1] Contribution from the Department of Entomology, Utah Agricultural Experiment Station.

ADDITIONS AND CORRECTIONS TO THE REVISION OF NORTH AMERICAN VESPINAE (ENTOMOLOGICA AMERICANA, 1932).

SECOND PAPER.

By J. Bequaert, Cambridge, Mass.

Since the first series of Additions was published in this Bulletin (1935, XXX, pp. 119–124), some valuable contributions have been made to the biology of North American Vespinae, notably by W. V. Balduf (1936), P. Rau (1938), R. G. Schmieder (1939) and L. H. Taylor (1939). But the outstanding work is C. D. Duncan's book (1939), which should stimulate interest in these and other social insects.

Additional Records and Observations.

Vespa crabro var. *germana* Christ.—The earliest published record of the introduction of the European hornet into the United States, by H. de Saussure (1868), seems to have been overlooked. There are recent trustworthy records of this wasp from Quebec, where it was taken in 1924 (T. J. Headlee, 1926) and North Dakota, where a male was taken at Tioge, in September, 1933, by D. E. Hardy (C. L. Hayward, 1937). In both cases the specimens may have been imported accidentally and further proof is needed that the species has become established there. *V. crabro* is now thoroughly at home in southwestern Connecticut, Long Island, Staten Island and most of New York State (Ithaca, one queen taken in 1936 by J. G. Franclemont), New Jersey, eastern Pennsylvania, Delaware, Maryland and the eastern part of West Virginia (L. H. Taylor, 1940). No doubt this powerful insect will eventually spread over most of eastern North America.

Vespula vulgaris (Linnaeus).—I have seen males from Idaho (Chatcolet) and Quebec (Outremont; Montreal); and queens and workers from South Dakota (Englewood), Wisconsin (Vilas Co.), and Ontario (Macdiarmid, Lake Nipigon; Low Bush, Lake Abitibi; De Grasse Pt.). According to L. H. Taylor (1940) it occurs in West Virginia.

Vespula maculifrons (R. du Buysson).—I have seen males from Quebec (Outremont), Pennsylvania, and Kentucky (Lexington); and queens and workers from Oklahoma (Le Flore Co.; Flint; Grove; Broken Bow; Latimer Co.; Barnard; Jay; Pawnee; Murray Co.; Osage Co.; Stillwater; Smithville), and Wisconsin. L. H. Taylor (1940) lists it from West Virginia.

V. maculifrons and *V. pensylvanica* are sometimes very similar in color, but there seems to be one reliable difference, overlooked thus far. The median, diamond-shaped black mark of the first tergite is long and narrow in *V. pensylvanica,* being usually as long as or longer than wide. In *V. maculifrons* it is as a rule transverse, much wider than long. This holds true in all the queens I have examined and in most workers. Sometimes in *V. maculifrons* the median black area fuses with the lateral black spots. In the shape of the median spot, *V. pensylvanica* agrees better with the Palearctic *V. germanica,* to which, moreover, it is most closely related in structure.

Vespula rufa var. *intermedia* (R. du Buysson).—I have seen it from Alaska (♀, Rampart), North West Territory (McLeod Bay, Great Slave Lake), Labrador (♀, Cartwright; and Anatalak Bay, Nain), and Quebec (♀, Longueuil).

Vespula rufa var. *vidua* (H. de Saussure).—I have seen it from Iowa (Page Co.), West Virginia (Berkeley Spring, Morgan Co.; see L. H. Taylor, 1939 and 1940), New Hampshire (N. Conway), and New Brunswick (Painsec).

Vespula rufa var. *sladeni* J. Bequaert.—I have seen it from Alberta (Nordegg; Jasper) and Washington State (Waitsburg; Blue Mts.; Pullman).

Vespula rufa var. *consobrina* (H. de Saussure).—I have seen it from Manitoba (Cedar Lake) and Delaware (Dover). L. H. Taylor (1940) reports it from West Virginia.

Vespula rufa var. *acadica* (Sladen).—I have seen it from Labrador (Anatalak Bay, Nain), Ontario (Ottawa; Macdiarmid, Lake Nipigon), and New Hampshire (N. Conway).

Vespula austriaca (Panzer).—I have seen additional specimens from Idaho (Moscow Mt., 1♀), Ontario (Low Bush, Lake Abitibi, 2 ♀; Macdiarmid, Lake Nipigon, 1 ♀), Alberta (Fawcett, 1 ♀; Nordegg, 2 ♀), and Oregon (Lucky Boy Camp, Blue River, 1 ♂).

Vespula squamosa (Drury).—A queen was taken at Mt. Pleasant, Iowa, in early spring (March 30, 1934), from under the bark of a hickory log by Mr. Millspaugh. The collections of the University of Nebraska contain a queen taken at South Bend, Nebraska, by Mr. E. G. Anderson. I have also seen this wasp from Michigan (South Haven, one queen, June 23, 1938; collected by C. W. Sabrosky), Kentucky (Lexington), northern New Jersey (Englewood Cliffs opposite New York, September, 1939; 1 ♀ taken by R. R. Dreisbach), West Virginia (Berkeley Springs, Morgan Co.; see L. H. Taylor, 1939), Oklahoma (Ottawa Co.; Nashoba; Aroke Co.; Wilburton; Flint; Sallisaw; Stillwater; Grove; Wyandotte), and Mexico (Tlalpam near Mexico City).

Vespula sulphurea (H. de Saussure).—I have seen this species from Oregon (7 miles W. of Butte Falls, 1850 ft., 1 ♀, Aug. 15, 1935; H. A. Scullen).

Vespula maculata (Linnaeus).—I have seen this species from Quebec (Arundel; Berthierville; Lac Nominque, Labelle Co.), Kentucky (Rivens; Farmers; Lexington), Oklahoma (Ottawa Co.), Saskatchewan (Indian Head), and North West Territory (Lake Sarahk; Hay River Post on Great Slave Lake). L. H. Taylor (1940) reports it from West Virginia. Sarahk Lake (63° 45′ N.) and Hay River Post (60° 51′ N.) are much farther north than any previously known locality of *V. maculata.* Normally this species builds aërial nests; but this summer (1940) I have observed it nesting underground, in a cavity of a gravel slope (N. Conway, New Hampshire).

Professor H. A. Scullen caught a worker of this species (10 mi. S.E. of Lebanon, Oregon) carrying off a worker of *Vespula vulgaris.*

Vespula arenaria (Fabricius).—I have seen it from North West Territory (McLeod Bay on Great Slave Lake), Iowa (Page Co.; Dickinson Co.), Labrador (Mud Lake), Newfoundland (St. Anthony), Nevada (Elko; var. *fernaldi* Lewis), and Nebraska (Spencer; etc.).

Professor H. A. Scullen bred from a nest of *V. arenaria,* at Corvallis, Oregon, three females of the parasite *Sphecophaga.* These were sent to Mr. R. A. Cushman, who informs me that they "apparently represent the summer generation of an undescribed species, although they may come within the variation of *S. burra* (Cresson). The specimens differ rather consistently from summer generation eastern specimens (*burra*) not only in being more extensively red, but also in several structural details." This appears to be the first record of *Sphecophaga* from the Pacific States and the third known host species.

The eastern *Sphecophaga burra* (Cresson) has been bred thus far from *V. maculata* (W. Couper, 1869; J. L. Zabriskie, 1894; R. A. Cushman, 1933; R. G. Schmieder, 1939) and *V. rufa* var. *vidua* (L. H. Taylor, 1939). It is probably a common parasite in the eastern United States and Canada. At the Boston Museum of Natural History, there are specimens (none bred) from several localities in New Hampshire (Jaffrey) and Massachusetts (Chester; Gloucester; Dedham).

Vespula norwegica var. *norvegicoides* (Sladen).—I have seen it from Manitoba (Gillam; Herchmer), North West Territory (Fairchild Pt., Great Slave Lake Region), and Labrador (island near Hopedale; five workers taken by Junius Bird from a nest under a flat stone in an Eskimo house). L. H. Taylor (1940) records it from West Virginia.

Vespula norwegica var. *albida* (Sladen).—Many workers and males of this Arctic form were taken by R. H. Daggy and D. G. Denning in Manitoba (Churchill; and on the Churchill River, 20 mi. S. of Churchill), early in August, 1937.

Vespula adulterina (R. du Buysson).—In southern Alberta one finds the typical form, as well as transitions to var. *arctica* (with spots on second tergite, but none on postscutellum).

Vespula adulterina var. *arctica* Rohwer.—I have seen it from northern Alberta (Peace River, Athabasca) and Nebraska (West Point). L. H. Taylor (1939 and 1940) found it in West Virginia.

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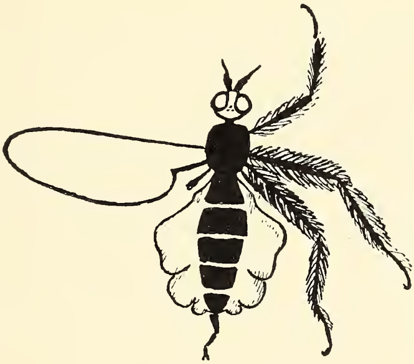
A CURIOUS HABIT OF AN EMPIDID FLY.

By George Steyskal, Detroit, Mich.

Groups of females of *Rhamphomyia fumosa* Loew were seen at dusk hovering in my garden a few inches above the ground with their abdomens inflated to several times normal size (4.5 mm. wide). The tergites were well separated and the pleural membrane was widely protruded as in the accompanying sketch. The lateral protrusions are covered with short black pile. The abdomen collapses on being punctured and apparently contains nothing but cells of air.



The flies were seen swarming on June 29, 1939, and on most evenings from June 14 until July 14, 1940. By July 23, 1940, no *fumosa* could be found. On June 14 a single sweep of the net gathered ten females and a few minutes later an estimated twenty were again hovering in the same spot. No males were seen in the immediate vicinity of the swarm, but a single male was swept from vegetation about a hundred feet away.

The locality is a beech-maple woods close to the River Rouge and the favorite swarming spot is next a clump of maidenhair fern, *Adiantum pedatum.*

Females of *fumosa* were also taken in Detroit in random collecting on June 24, 1935, and June 10, 1939, and males on June 6, 10, and 11, 1939. A pair was taken in Ann Arbor, Mich., on June 7, 1936.

NOTES ON THE SCHAEFFER TYPES IN THE FAMILIES CEBRIONIDAE, ELATERIDAE AND THROSCIDAE.

By M. C. Lane and W. S. Fisher

Charles F. A. Schaeffer (1860–1934), for many years Curator of Insects in the Museum of the Brooklyn Institute of Arts and Sciences, was a prolific describer of new species of Coleoptera. Between 1909 and 1917 he published the descriptions of twenty-five new Elateridae, three new Cebrionidae, and three new Throscidae. After his death his large personal collection of Coleoptera was broken up and the Elateroidea (exclusive of Buprestidae and Rhipiceridae) were purchased by H. P. Lanchester and the senior author jointly* to further their taxonomic studies in these groups. Upon comparison of material obtained in this purchase with specimens from the Schaeffer Collection received by the U. S. National Museum, October 25, 1929, from the Brooklyn Museum, it was found that Schaeffer's type material in these families was distributed between the two collections.

In common with other taxonomists of that period, Schaeffer described most of his species from cotype series of two or more specimens. In only seven of his thirty-one descriptions of new species in the groups under consideration did he designate a specimen as type, but six other species were each represented by only one specimen. Sometimes a small, red, printed "type" label was placed on the pin immediately below a specimen and in three cases two specimens in the same series were so marked, evidently meant as male and female types. In still other species the word "type" was written on the determination label attached to the pinned specimen. For three species the type was not indicated either in the description or on the specimens included with the determination label.

All the Schaeffer material in the Lane and Lanchester Collections, as well as that of the same families received by the National Museum, has been carefully studied and compared with the original descriptions with the object of making definite type selections. As a result of this study the following list has been prepared designating particular specimens as holotypes, lectotypes, allotypes, paratypes, or metatypes and indicating their disposal. The metatypes are specimens that were added by Schaeffer after publication of the descriptions. Localities given in the list are those of the published description with source of collection or collector. Numbers in parentheses refer to the bibliographical references at end of paper.

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* The Lane and Lanchester Collections are both at present at the Bureau of Entomology and Plant Quarantine laboratory at Walla Walla, Wash., being cared for in a fireproof vault.

The Following Thirty-one Elateridae, Cebrionidae, and Throscidae were Described by Charles Schaeffer.

Cebrio antennatus (4, p. 107). Arkansas (Coll. Dietz). Lectotype in U.S.N.M. Col., No. 42631, one paratype in Lane Col., one paratype in Lanchester Col.

Cebrio emarginatus (4, p. 108). New Mexico (Coll. Dietz). Holotype in U.S.N.M. Col., No. 54317.

Plastocercus granti (5, p. 266). Southwestern Texas (Chapman Grant). Lectotype in U.S.N.M. Col., No. 42601, one paratype in Lane Col. At present this species is placed in the genus *Octinodes.*

Monocrepidius scissus (1, p. 378). Tybee Island, Ga. (Henry Wenzel). Lectotype (male) and allotype (female) in U.S.N.M. Col., No. 42615, one paratype in Lane Col., one paratype in Lanchester Col. At present this species is placed in the genus *Conoderus.*

Monocrepidius similis (*texanus* Schaeffer ||) (1, p. 379; 2, p. 436). Brownsville, Tex. Lectotype in U.S.N.M. Col., No. 42616, one paratype in Lane Col. At present this species is placed in the genus *Conoderus.*

Drasterius thoracicus (6, p. 40). Southern Illinois (Coll. Dietz). Holotype in U.S.N.M. Col., No. 54318.

Drasterius subornatus (6, p. 40). Brownsville, Tex. Lectotype and one paratype in U.S.N.M. Col., No. 54327. Eight paratypes in Lane Col., seven paratypes in Lanchester Col. (Note: Some of the paratypes were glued on cards in the Schaeffer Col., among which were eight specimens that were not conspecific with mounted and labeled specimens, one not even an elaterid, which would account for the 25 specimens mentioned in the description.)

Drasterius (*Aeolus*) *nigriventris* (6, p. 41). Brownsville, Tex. Lectotype in U.S.N.M. Col., No. 54319, two paratypes in Lane Col. and one paratype in Lanchester Col.

Drasterius (*Aeolus*) *scutellatus* (6, p. 41). Brownsville, Tex. Holotype in U.S.N.M. Col., No. 54320, two paratypes in Lane Col., and two paratypes in Lanchester Col. (Note: The 7-mm. specimen was made the holotype.)

Diplostethus (*Ludius*) *opacicollis* (5, p. 260). Nogales (Nunnenmacher) and Huachuca Mts., Arizona (Schaeffer). Holotype and two paratypes in U.S.N.M. Col., No. 42623, one paratype and one metatype in Lane Col., and one paratype and one metatype in Lanchester Col.

Trichophorus carolinensis (5, p. 261). Southern Pines, N. C. (A. H. Manee). Lectotype and two paratypes in U.S.N.M. Col., No. 42622, four paratypes in Lane Col., and four paratypes in Lanchester Col. At present this species is placed in the genus *Crigmus.*

Trichophorus substriatus (5, p. 261). Arizona (Coll. Dietz). Holotype (male) in U.S.N.M. Col., No. 54321. At present this species is placed in the genus *Crigmus.*

Trichophorus arizonensis (5, p. 262). Santa Rita Mts., Ariz. (Marsden). Holotype in U.S.N.M. Col., No. 42620, one metatype in Lane Col., and one metatype in Lanchester Col. At present this species is placed in the genus *Crigmus.*

Trichophorus variatus (5, p. 262). Brownsville, Texas (Schaeffer). Lectotype and seven paratypes in U.S.N.M. Col. No. 42621, two paratypes in Lane Col., and two paratypes in Lanchester Col. At present this species is placed in the genus *Crigmus.*

Orthostethus caviceps (5, p. 263). Huachuca Mts., Ariz. (Schaeffer). Lectotype (male), allotype (female), one paratype in U.S.N.M. Col., No. 42624, two paratypes in Lane Col., two paratypes in Lanchester Col.

Oxygonus montanus (6, p. 43). Catskill Mts., Ulster County, N. Y. (Ernest Shoemaker). Lectotype and five metatypes in U.S.N.M. Col. No. 42628, one paratype and two metatypes in Lane Col. and three metatypes in Lanchester Col. (NOTE: There were one specimen from the Brooklyn Museum Collection and two in the Schaeffer Col. with identical labels fitting the type locality given in the description and one other specimen from Slide Mt., Ulster County, N. Y., July 4, 1915, with a cotype label probably placed there by Schaeffer. In addition there were found six other specimens labeled Slide Mt., Ulster County, N. Y., July 3, 1917, one from Maplecrest, Catskill Mts., N. Y., June, and one from Wallface Mt., N. Y., which were apparently considered this species by Schaeffer and hence can be called metatypes.)

Betarmon californicus (6, p. 42). Tulare County, Calif. (O. Dietz). Holotype in U.S.N.M. Col., No. 54322. At present this species is placed in the genus *Agriotella.*

Agriotes brunneus (5, p. 264). Beaver Canyon, Utah (Doll and Engelhardt). Holotype in U.S.N.M. Col., No. 42625, one metatype (Utah) in Lane Col. (Note: Locality label of holotype was in pencil with date VI–2, that of the metatype was in ink without date but with determination label in Schaeffer's handwriting.)

Glyphonyx bimarginatus (5, p. 264). Enterprise, Fla. (O. Dietz). Holotype in U.S.N.M. Col., No. 54323.

Glyphonyx dubius (5, p. 265). Huachuca Mts., Ariz. (Schaeffer). Lectotype in U.S.N.M. Col., No. 42626, two paratypes in Lane Col., and two paratypes in Lanchester Col.

Glyphonyx ferruginosus (5, p. 266). Huachuca Mts., Ariz. (Schaeffer). Lectotype and two paratypes in U.S.N.M. Col., No. 42627, one paratype in Lane Col.

Elater sanguinicollis (5, p. 257). Beaver Valley, Utah (Doll and Engelhardt). Lectotype and one paratype in U.S.N.M. Col., No. 42617, and one metatype in Lane Col. At present this species is placed in the genus *Ampedus*.

Elater oregonus (5, p. 258). Dilley, Oreg. (Coll. O. Dietz). Holotype in U.S.N.M. Col., No. 54324. At present this species is placed in the genus *Ampedus*.

Megapenthes longicornis (5, p. 258). Huachuca Mts., Ariz. (Schaeffer). Lectotype (male) and allotype (female) in U.S.N.M. Col., No. 42618, three paratypes in Lane Col., and three paratypes in Lanchester Col.

Megapenthes nigriceps (5, p. 259). (6, p. 42). Brownsville, Tex. (Schaeffer). Holotype (male) in U.S.N.M. Col., No. 42619 and allotype (female) in Lane Col.

Megapenthes tarsalis (5, p. 259). Southern Pines, N. C. (A. H. Manee). Holotype in U.S.N.M. Col., No. 54325.

Aptopus subcarinatus (5, p. 256). Huachuca Mts., Ariz. (Schaeffer). Lectotype in U.S.N.M. Col., No. 42614, eight paratypes in Lane Col., and seven paratypes in Lanchester Col.

Aptopus rugiceps (5, p. 257). Huachuca Mts., Ariz. (Schaeffer). Lectotype in U.S.N.M. Col., No. 42613, two paratypes in Lane Col., and two paratypes in Lanchester Col.

Drapetes ecarinatus (3, p. 62). El Taste, Lower California (G. Beyer). Holotype in U.S.N.M. Col., No. 54326.

Aulonothroscus rugosiceps (3, p. 63). Brownsville, Tex. (O. Dietz). Lectotype in U.S.N.M. Col., No. 42629, one paratype in Lane Col.

Throscus carinicollis (3, p. 63). Elk County, Pa., New Jersey.

Lectotype in U.S.N.M. Col., No. 42630, four paratypes in Lane Col., and three paratypes in Lanchester Col.

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3. Bull. Brooklyn Ent. Soc., XI, pp. 62–63, June 1916.
4. Bull. Brooklyn Ent. Soc., XI, pp. 107–108, Dec. 1916.
5. Jr. N. Y. Ent. Soc., XXIV, pp. 256–267, Dec. 1916.
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NEW SPIDER RECORDS FOR NEW YORK STATE.

By Borys Malkin, New York, N. Y.

During the season 1940 I collected a number of spiders, some of which are new records as listed below:

Teridion albidum, Bks.—New Rochelle, June. New to "Continental" New York.

Eugnantha pallescens Cambr.—Wantagh, Long Island, June. New to Long Island.

Tetragnatha lacerta Walck.—Montauk, L. I. June 16, 2 females. New to New York State.

Philodromus lineatus Em.—Wantagh, L. I. June. New to L. I.

Philodromus ornatus Banks—Wantagh, L. I. June. New to L. I.

Xysticus discursans Keys—Yonkers, May, 2 males. This species is not truly new to the State, Gertch recorded it from the State including L. I. (Bul. Am. Mus. Nat. Hist., Vol. LXXVI, Art. VII; pp. 364–5).

Xysticus fraternus Bks.—Bear Mt. June. New to "Continental" N. Y.

Xysticus versicolor Keys—Nyack, March. New to "Continental" New York.

Tibellus marinum Menge.—Montauk L. I. June 16, single female, Gertch.

According to Gertch, the species is quite common in North Atlantic States. Apparently missed in the list.

All of the above specimens were identified by Mr. W. J. Gertch.

A NEW SPECIES OF EUPARYPHUS FROM MICHIGAN (DIPTERA, STRATIOMYIDAE).

By George Steyskal, Detroit, Mich.

Euparyphus (Caloparyphus) adaleonora n. sp.

Belongs in the group of James' recently erected (Pan-Pacific Ent., 15: 49, 1939) subgenus *Caloparyphus* containing *amplus, currani, crucigerus* and *tahoensis,* although it also resembles *major.*

Female: Head black, with the following areas yellow: lower half of the posterior orbits and a spot at the upper end of the same; a stripe on the sides of the face and front, widest below, where it is a little wider than the width of the antennae, separating from the eyes a little on the front to end a short distance below the level of the lower ocellus; a very small spot at each side of the base of the antennae. The very narrow cheeks are black, as also the mouth parts, except the labellae. Very fine shining white tomentum (pruinosity) is present on the yellow portion of the lower posterior orbits and on the proximal half of the width of the yellow facial orbits. The upper two-thirds of the portion of the front between the yellow stripes is strongly longitudinally wrinkled; the lower third is smooth and polished. The antennae are wholly black, as long as the head, the respective lengths of the segments, from base outward .2, .2, .27, .17, .16, .23, .13, .4 mm., the last three segments concave on the outer side. The eyes are bare. Thorax black, the following areas yellow: a pair of dorsal wedge-shaped spots on the anterior half of the presutural area; sublateral vittae in front of the suture, connected with the pale humeri; the postalar calli; a spot on the mesopleura extending narrowly along the notopleural suture almost to the humeri; a spot at the top of the sternopleura; scutellum, except base of sides and a line at base beneath. The scutellar spines are yellow with dark tips, and are separated by slightly more than their length. Halteres yellow, their stems somewhat infuscated. Squamae blackish with pale fringes. Wings hyaline, veins yellow, vein R_4 wanting, posterior veins not reaching wing margin, and the first posterior reduced to a fold beyond its base. Legs yellow, the femora black except the tips; a brown annulus in center of hind tibiae; the third and fourth tarsal joints, especially on front legs, brown to black. Abdomen black, with a forwardly arcuate yellow band on third segment, starting in posterior corners of the segment, about as wide as half the length of the segment, interrupted in the middle by less than the greatest width of the band, and on each side of the interruption with a round knob preceded by a constriction. There are narrower oblique yellow stripes starting in the posterior corners of the fourth segment extending about halfway to the middle, and there is a broad triangle of yellow in the center of the apex of the fifth segment extending more than two-thirds the distance to the anterior margin of the segment. The venter is black with small yellow spots in the center of the second, third and fourth segments and the apex of the fifth segment is a little pitchy. The pile is everywhere rather sparse, short and white, longest on parts of the pleura. Length, 8 mm.

Holotype, female, Loon Lake, McCarty Creek, Lake County, Michigan, August 3, 1934 (A. L. Olson—L. K. Gloyd), in Univ. Mich. Mus. Zool. A number, 33, on the label refers to the following passage in the collectors' notebook. "Lake Co. McCarty Creek. About 5½ mi. S.E. of Loon Lake. Shallow spring-fed cold swift stream from 8 to 15 ft. in width. Banks of creek wet with seepage from springs. Sand and gravel bottom. Open, rather barren hill sloped to creek, covered sparsely with grass, very few shrubs, thistles. Only a few large trees on hill. Had once been cleared for a farm home, but was entirely abandoned, with no buildings left standing." Miss Olson says that she and Mrs. Gloyd had driven through rather dense woods to reach this locality.

It may be remarked that this represents apparently the first record of the subgenus *Caloparyphus* east of the Mississippi River.

SOME NOTEWORTHY MISSOURI BUTTERFLIES: PAPILIO TROILUS L. AB. RADIATUS STKR. AND A VARIATION OF LYCAENOPSIS PSEUDARGIOLUS (BDV. & LEC.) (LEPIDOPTERA, PAPILIONIDAE AND LYCAENIDAE).

By Harold I. O'Byrne, Webster Groves, Missouri.

The aberrant form of *Papilio troilus* Linn. named *radiatus* by Strecker (Lep. Rhop. Het., suppl. 3, p. 17, 1900) differs from normally colored individuals of *troilus* in having the pale submarginal spots above and the outer row of orange spots below enlarged and pointed inwardly, encroaching upon the greenish-gray (male) or blue (female) area of the hind wings above and more or less completely obliterating the blue spots and inner row of orange spots below. The occurrence of this striking form at Ranken (4 miles east of Eureka, in St. Louis County), Missouri, in 1935, is of particular interest because of the number of specimens taken in this restricted area within a short time. My captures consist of two males, July 25 and August 2, and one female, August 1; in addition, male specimens were taken by two other collectors, one in the same place by Dr. E. P. Meiners, of St. Louis, at about the same time, and the other by Mr. P. S. Remington, Jr., of St. Louis, at Cedar Hill, Missouri, on April 21. My males were both found among large aggregations of normal males assembled on moist ground near small streams; while the female was captured while feeding upon flowers of ironweed, *Vernonia Baldwini* Torr. The species was extremely abundant during late summer in 1935, but no additional specimens of *radiatus* were seen among the thousands of *troilus* observed in various localities. The finding of several specimens of *radiatus* at about the same time in this one locality suggests that they were all offspring of the same parents.

The form *lucia* Kby. of *Lycaenopsis pseudargiolus* (Bdv. & Lec.) differs from the other early spring form, *marginata* Edw., that occurs in the northeastern part of the United States, in having a brown discal patch on the under side of the hind wings in addition to the heavy brown border characteristic of *marginata.* A female specimen taken by me at St. Louis, Missouri, in early April, 1924 (the exact date was not recorded), bears a similar relation to typical *pseudargiolus* (*violacea* Edw.), the usual early spring form in Missouri, in having a brown discal patch like that of *lucia;* and it agrees with *pseudargiolus* in lacking the brown border of *lucia* and *marginata.* The specimen has been masquerading in my collection under the name of *lucia,* but because of the locality of its capture and the absence of the brown border referred to, it should properly be regarded as an individual variant of *pseudargiolus.*

Odontomyia Records (Diptera, Stratiomyidae).—*Odontomyia profuscata* Steyskal, Livingston County, Mich., E. S. George Reserve, Sta. 1, May 11, 1938 (I. J. Cantrall), agrees perfectly with the types from Point Pelee, Ont., and Buckeye Lake, Ohio. *O. rufipes* Loew, Dade County, Fla., Paradise Key, November 1, 1925 (T. H. Hubbell), has not apparently heretofore been recorded for the United States. These specimens are in the University of Michigan Museum of Zoology.—GEO. STEYSKAL, Detroit, Mich.

TWO EUROPEAN TORTRICIDAE (LEPIDOPTERA) NOT HITHERTO RECORDED FROM NORTH AMERICA.

By Alexander B. Klots, College of the City of New York, N. Y.

Dr. A. Glenn Richards, Jr., of the Department of Zoology of the University of Pennsylvania, recently sent me a number of specimens of two species of Tortricidae taken by him at Valley Stream, Long Island, New York, July 1, 1939. Both, to our surprise, turn out to be European species that have not hitherto been recorded in print from North America. Both are of potential economic importance. They are as follows:

(1) *Argyrotoxa forskaleana* Linnaeus. This is a common and widespread species in England and on the Continent. It is recorded by Meyrick (Revised Handbook of British Lepidoptera, London, 1929, p. 517–518) as feeding on Maple. The genitalia are figured in Pierce & Metcalf (The Genitalia of the British Tortricidae, 1922, p. 20, pl. 8). In the key to the species of *Argyrotoxa* given by Forbes (Lepidoptera of New York and Neighboring States. . . . Cornell University Agr. Exper. Sta. Memoir 68, June, 1923, p. 480) it would run to *bergmanniana* Linnaeus. It differs greatly from *bergmanniana,* however, in possessing but a single, dark, transverse band on the fore-wing basad of the subterminal band. This band begins slightly basad of the middle of the costa as a narrow line, which runs, slanting outward, to about the middle of the wing and then bends sharply and runs to the middle of the inner margin. The lower half of this band is often covered by a light fuscous blotch, which may cover nearly a fifth of the area of the wing; but this blotch is entirely absent in some specimens. Two small, raised, black scale-tufts occur along the lower part of the band.

Dr. Forbes writes me that he has received quite a number of specimens at various times since 1934 from Mr. Roy Latham of Orient, L. I. Two specimens were received from Dr. Richards.

(2) "*Tortrix*" *unifasciana* Duponchel. Like the last, this species is common and widespread in England and continental Europe. It is recorded by Meyrick (*loc. cit.,* p. 509) as feeding on Privet (*Ligustrum*). The genitalia are figured by Pierce (*loc. cit.,* p. 5, pl. 2). In Forbes' key to the genera of Tortricidae (*loc. cit.,* p. 377) it runs to *Tortrix*. From the North American species of this genus there listed it may be separated by its dark, orange-brown ground-color and by the very long costal fold of the fore-wing of the male, which exceeds the middle of the wing. As a matter of fact the

species does not appear to belong in the genus *Tortrix* at all, but for convenience this name is used here.

Dr. Richards writes me that the species was excessively common on his Privet hedge, so that he could have netted hundreds of specimens.

I have compared the male genitalia of two of the Long Island specimens with the genitalia of a specimen from England and one from Germany.

European specimens show considerable variation in color. Some have a rather light ground-color, on which a darker brown, transverse median band and subapical, costal patch stand out clearly. The majority, however, have the ground-color dark and the markings obscure. All the Long Island specimens conform to the latter type.

NOTES ON NOTIOPHILUS

By C. A. Frost, Framingham, Mass.

During my early collecting I captured a pair of *novemstriatus* and ever since then these elegant little creatures have greatly intrigued me. This species is the most common one locally but this is not at all evident until one knows where to look for them; it was many years before I discovered their abundance. They are fond of spots where green moss grows in wooded areas especially near streams and ponds on land sloping down to the water. This moss is probably of several species and one kind, called "Bear's Wheat" in Maine, has wheat-like grains at the tips of slender stalks; other kinds look like a carpet of green.

Notiophilus novemstriatus occurs from the last of March to the end of October and has been taken by sifting. A great number were sent me by Mr. O. L. Cartwright of Clemson College, S. C., among other material taken by a "sifting machine" at Florence, S. C., in February, 1938. A specimen was taken at Paris, Maine, on Sept. 19, 1928, probably by sifting.

I have found that if I sit down and remain for some time in favorable situations, sooner or later I see the armor of *Notiophilus* shining in the sun as it slowly picks its way over the moss or around stones and other obstructions. By raking away dead leaves and sticks or stirring up bunches of grass they are often started into sight. They are very clever in evading capture by slipping into a crevice in the ground or beside a stone and also by other means not yet clear to me.

Ever since I found a dozen or more congregated along a mossy bank in the woods on the shore of a pond one April afternoon, I have suspected that they are attracted by flights of minute water-born gnats which may be grounded by a breeze at convenient places. This suspicion has been strengthened by seeing one with a gnat in its jaws about 6 P.M. on April 29, 1940, near the pond.

Occasional specimens taken with typical *novemstriatus* lack the anterior ocellate puncture of the elytral apices, but they are undoubtedly conspecific.

In July at Lake Garfield, Monterey, Mass., I once noticed a number of *N. aeneus* Hbst. travelling to the lake in the late P.M. and they were probably on a hunting trip after emerging gnats. This species was also taken at Paris, Me., July 13, 1938.

On the White Mountain trails I have found *nemoralis* Fall by scratching away the dead leaves slightly to one side of the beaten path. If time permitted one could probably take plenty of this species in this way. These captures were on the Tuckerman Ravine trail, July 22, 1930, at an elevation of about 3000 feet.

My only captures of *N. aquaticus* L. were taken in debris washed down from a wooded area into a landlocked pond in a pasture at Paris, Me., on July 10, 1915.

N. borealis Harris has been taken by me near the Lake of the Clouds on Mt. Washington, N. H., on July 5, 1914, and on July 22, 1930.

N. semistriatus Say is evidently very rare locally as I have taken but one specimen: Framingham, Mass., Aug. 11, 1906. I have one from Barnstable Co., Mass., taken by N. S. Easton, July 30, 1913.

A Useful Catalogue.—We have received the 1940–41 edition of the Biology Catalogue and Teachers' Manual of the General Biological Supply House of Chicago. It is mentioned here because it is in its way and within its limitations, a very useful and highly informing compressed text on biology. Of course, its frank purpose is to sell biological material and supplies, but aside from this it is full of excellent line drawings of life-forms and activities, as well as reproductions from photographs. It also gives many directions for collecting and keeping life material for study. It is, on the whole, a very interesting publication. This is *not* an ad.—J.R.T.-B.

THE PRESENT STATUS AND SYNONYMY OF SOME ORSILLINE SPECIES (HEMIPTERA, LYGAEIDAE).

By Robert L. Usinger, Davis, Calif.

In examining collections of the genus *Nysius* and its allies from various parts of the world, in my revisional studies of the Hawaiian and Australian Orsilline faunas, types have been encountered from other regions. Inasmuch as some of these alter the present status of some of our common North American species, it seems best to record the data at this time in order to make it available for studies now in progress elsewhere on the *Nysius* of the United States.

Thanks are due the authorities of the Provincial Museum in Quebec; Dr. O. Lundblad of the Naturhistoriska Riksmuseum, Stockholm; Mr. W. E. China of the British Museum (Natural History); and Dr. W. A. Hilton of Pomona College, Claremont, California, for the opportunity to study the types of Provancher, Stål, Distant, and Baker respectively.

I am further obliged to Mr. China for supplying me with a specimen of *Mesostates maculatus* Reuter (1882) by which I have been able to establish the correct position of the genus *Mesostates,* not near *Orsillus* as stated by Reuter, but in the tribe Ischnorrhynchini of the neighboring subfamily Cyminae. Mr. China also sent the type species of the genus *Nysiodes, e.g., typus,* Distant (1918) (see also China, 1937), which clearly belongs to the genus *Camptocoris* Puton (1886) as redefined by Kiritshenko (1931).

1. *Ortholomus scolopax* (Say) (1832).
   (=*Nysius saint-cyri* Provancher, 1872).
   (=*Ortholomus uhleri* Baker, 1906).

Horváth (1908) concluded that Provancher's *saint-cyri* was a synonym of the common species of *Nysius* (*thymi* Wolff?) which he encountered in the vicinity of Buffalo, New York. In this he was followed by Van Duzee (1917) who did not see the type of this species when he studied Provancher's Hemiptera (1912). The series of type specimens of *saint-cyri* were in a box separate from the rest of the Lygaeidae when I saw the collection in 1937 so this may account for their being overlooked previously. The species is identical with *Ortholomus scolopax* (Say).

In Baker's excellent collection of Orsillini at Pomona College is the unique type of *Ortholomus uhleri* Baker, a male from Polk Co., Wisconsin, collected in July. It differs from typical members of the variable *scolopax* only in its evenly rounded pronotal disk without depressed callosities. Judging from the extreme variation within the limits of the allied species, *jamaicensis* Dallas, as well as from the variety of specimens of *scolopax* obtainable in a single locality, *uhleri* should be synonymized.

2. *Ortholomus jamaicensis* Dallas (1852).
(=*Nysius spurcus* Stål, 1850).

A female specimen from the type series labelled "Taiti, Kinb." has pale hemelytra with reddish corial tips. The membrane is variegated with brown on the middle of the apical half. The body is densely clothed with pale, appressed pubescence. The bucculae are elevated only anteriorly. The rostrum reaches to the middle of the posterior coxae or to the posterior margin of the metasternum, the first segment not reaching base of head.

Size: Length 5.13 mm., width 1.6 mm.

This specimen is certainly *jamaicensis* although I am unable to find any specimens in my series with such a short rostrum. A second female specimen, "Mexico, Sallé" is identical with dark specimens of *jamaicensis,* having the same dark coloration, ill-defined longitudinal fasciae on the pronotum and alternated connexivum.

Locality records for the Eugenies Resa expedition have proved to be notoriously inaccurate and several competent collectors, *e.g.,* Adamson, Mumford, Miss Cheesman, and Zimmerman, have failed to turn up any Orsillini in the Society Islands. Hence it seems safe to assume that the Tahiti record was entirely erroneous in this case. Stål, himself, recorded it from various localities in tropical America.

3. *Belonochilus numenius* (Say) (1832).
(=*Belonochilus mexicanus* Distant, 1893.)

Mexicanus was described from Orizaba, Mexico, and was stated to differ from *numenius* by the "rostrum only extending over three-fourths the length of the abdomen." In the long series before me including cotypes of *mexicanus* the rostrum varies in length, reaching only to the middle of the abdomen in San Diego (California) specimens and almost or quite reaching the tip of the abdomen in Sacramento specimens. Some specimens from the eastern United States have a long rostrum as do specimens from Arizona, while in a series from Buffalo, New York, the rostrum scarcely exceeds the middle of the abdomen.

Other variation includes the femoral spines which are greatly reduced in "*mexicanus*" and entirely wanting in the San Diego series whereas they are distinct and long in eastern United States specimens. The third antennal segment may be subequal to the fourth (Sacramento) or one-fifth shorter (Arizona) than the fourth segment.

4. *Nysius californicus* Stål (1859).

This large species is of southern origin, occurring throughout Central and South America. A closely allied species, *"Ortholomus" naso* Van Duzee (1933), is found in the Galapagos. The same remarks regarding authenticity of localities apply to Stål's *sordidus* (1859) from "Insula Taiti" as to *spurcus* (see above under *jamaicensis*). Type specimens of *sordidus* were found to agree with the shorter darker form of *californicus* found in Mexico and further south. Whether *sordidus,* the "var." *alabamensis* Baker (1906), and the smaller and darker West Indian and Central American *inaequalis* Uhler (1894) should be retained as subspecies and if so, how they are to be distinguished from each other, must remain for future study.

Mr. W. E. China very kindly compared specimens of *californicus* (South American) with the type of *basalis* Dallas (1852) and reports (*in litt.*) that they are "much larger and differently colored and marked from basalis." In *basalis* the costal margins are straight.

C. F. Baker (*in litt.* to E. P. Van Duzee soon after the publication of his "Notes," 1906) stated that he had erroneously interchanged the names *"providus"* and *"inaequalis"* in that paper. He corrected this mistake in his collection for he has a series labeled *"Nysius californicus* var. *inaequalis* Uhl." from Managua, Nicaragua in his collection at Pomona.

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A European Buprestid in the United States.—Among a number of specimens of *Agrilus* sent to Mr. C. A. Frost for identification, one was included which was returned unnamed. He suggested that it might be a European form. Subsequently the specimen in question was sent to Mr. W. S. Fisher of the U. S. National Museum, who returned it shortly, thereafter identified as *Agrilus derasofasciatus* Lac. This species is widely distributed through Central and Southern Europe. Junk's catalogue gives its range from Spain and France to Central European Russia, Caucasus and Armenia. It is also found on Balearic Islands, and Crete, and in Morocco and Algeria.

The original description is to be found in: Lacordaire et Boisduval, Faune Ent. des env. de Paris, 1835, p. 613.

I collected this single specimen on July 3, 1939, in Van Cortlandt Park, N. Y. C., from wild roses, along with a great number of the common *A. communis rubicola* Perrin.—BORYS MALKIN, New York City.

THE SELECTIVE VALUE OF AESTIVATION AND HIBERNATION IN A CALIFORNIA BUTTERFLY.

By William Hovanitz, California Institute of Technology

Some notes and observations on the phenomenon of aestivation and hibernation in some western races of *Melitaea phaeton* will be described and discussed in this paper.

Hibernation and aestivation are usually considered as torpid states of animals, developed for the purpose of enabling the animals to withdraw as far as possible from an unfavorable environment without actual migration. In regions where most of the research upon this phenomenon has been performed, the winter season presents the unfavorable environment and the studies have been made, therefore, on hibernation. In arid or relatively arid regions, however, the entire season between wet periods may be unfavorable for many forms. At the lower elevations in California, this season extends from the end of the spring rains (April, May or June) until the next December or January. The temperature throughout the entire year is essentially mild, though the winters in the north are cold for a short period and the summers in the southeastern deserts become rather hot. For many butterflies whose larval food-plants grow only during the rainy season this means a continuous, combined aestivation and hibernation from May or June until the next January or February.

The races of *Melitaea phaeton* in California (the *Euphydryas chalcedona* and *anicia* variations of some taxonomists) present some interesting problems. The life-cycle of this insect is so arranged that it can exist only in areas where its food-plant is in green, growing condition (not "leathery" like many desert species get in dry seasons) for a period extending through the entire life-cycle of the butterfly (not only during the larval life). The species aestivates as a quarter-grown larva at the base of or near the food-plant. In the spring (February at low elevations), the larvae begin feeding again; the food, of course, must be green at this time. After a period of feeding, they pupate and later emerge as adults. These adults normally lay eggs upon the tips or upon the uppermost leaves of the growing plant and these eggs hatch in about a week. The plant at this period, also, must be green and fresh because the larvae must feed and grow for some time before aestivation sets in. Although in the case of *Argynnis* the young larvae will hibernate without first feeding, unpublished experiments have shown that young

Melitaea larvae will die at this time if not fed. The larvae will feed until about one-fourth grown and will then go into a stupor from which it has not been possible as yet to immediately awaken them. In the coastal area of California, the food plants of the species (*Scrophularia californica, Diplacus* spp., and *Pentstemon cordifolius*) are green and are in good condition as food from January until June in normal years. In central California the larvae are first found upon the plants in early February, adults emerge in April and May, and the second generation larvae disappear in late May and early June. In the Mohave desert of southeastern California the food plant of the species (*Pentstemon antirrhinoides*) is usually green from March until May. The active part of the life-cycle of the *Melitaea* is correspondingly shortened (genetically, as shown by preliminary laboratory experiments).

Some inquiries into the ultimate cause determining the onset of the diapause seem to be leading the author to consider the phenomenon in *Melitaea* as of entirely genetic origin. Of the environmental conditions in the wild, none seem to be of sufficient importance to directly cause it. The plant may be green with plenty of fresh leaves, the air may be humid, the temperature not too hot and yet the larvae aestivate. It is the same in the laboratory; no amount of food can induce the larvae to continue to feed. Since it was found that neither temperature nor moisture had any effect, an experiment was performed to see if length of day had any. Larvae from wild eggs were grown, half at an eight-hour day and half at a fourteen-hour day (temperature and humidity being kept constant and identical in both cases). Except for the fact that those larvae at fourteen-hours hibernated first, there was no difference in the reaction. Possibly, had the eggs not been allowed to remain in the wild until they hatched, the results might have been different; this will be studied further in the future. More evidence for the supposition that hibernation is independent of the environmental conditions in this species lies in the fact that out of each brood of wild larvae bred in the laboratory, a certain small proportion never reach the pupal stage with the others but will go into an aestivation or hibernation period which would correspond in the wild to two years or more of diapause. Likewise, in a cross between an isolated Mohave desert population and a coastal population (data kindly supplied by C. M. Dammers, from unpublished experiments) the hybrids gave an extremely mixed relationship such as would be expected with the mixing and reshuffling of all the probable genes responsible for the phenomenon. Unfortunately, numerical counts were not made of the hybrid reactions. However, it was found that many larvae hibernated one year as normal but others hibernated and aestivated for two, three, four and some are still going on the fifth year. All larvae were treated alike and fed well.

The selective value of hibernation and aestivation is decidedly easy to visualize. Any larvae which failed to aestivate would soon perish. Even if the food did not dry up before pupation, the newly-hatched larvae of the following generation would certainly perish. Individuals homozygous for genes responsible for the failure would, thus, be eliminated within that generation or in the early part of the next. Genes responsible for diapause of more than two years would be favored in one sense and be at a disadvantage in another. Being in an immobile state for any length of time is disadvantageous to any living thing and conducive to rapid elimination. Also, the food stored in the body is not inexhaustible even though the metabolic processes are at a slow rate. Elimination could, therefore, result from either starvation or destruction by environmental factors. In cases where any season's generation may be eliminated by causes due to parasitism, death or drying-up of the food-plant, etc., the individuals hibernating for more than one year will be greatly favored; upon them will depend the continuance of the population. Such a situation is not so far removed from the possible as may be supposed. Ford and Ford[1] describe a case in which a population of *Melitaea aurinia* (an English form) was very abundant but became so heavily parasitized that it became extinct except for one or two observed individuals per year. It was noted that there was a high frequency of aberrations in phenotype at the time when the population began to rebuild itself; these would result either from an increase in unfavorable gene combinations or mutations, or from a lesser destruction of these by natural selection. If the population had to rebuild itself with the material which had hibernated for more than one year, such a situation might be explained by the fact that these individuals were physiologically aberrant to begin with. Their genotype was not normal and hence it would be expected that a large percentage of aberrant phenotypes would be produced. Goldschmidt has shown that an only slightly unbalanced genotype can create havoc with the timing of pattern and color formation. In this case, many generations would be necessary to balance the many genes controlling hibernation and other life processes in the same or in a possibly changed environment. Ford and Ford have shown the latter to be the case with respect to the phenotype in the population they had under observation.

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[1] Ford, H. D., and E. B. Ford. 1930. Fluctuations in numbers, and its influence on variation, in *Melitaea aurinia* Rott. (Lepidoptera). Trans. Entom. Soc. Lond., 78: 345–351.

Occasionally an autumn generation of this species (*M. phaeton*) is produced in the Mohave desert after a rare rain at that time of the year. It is not known whether this generation is eliminated by unfavorable conditions or actually produces offspring which appear the next spring. There is some evidence to believe that it is eliminated, however, because in one observed case large numbers of dead pupae were found upon the food plant, killed perhaps by the sudden approach of cold weather in winter. It may be that such generations are drains upon the life of the population as a whole. Presumably, therefore, hibernation in this species is not entirely controlled by the environmental conditions nor is it a "time-switch" utterly independent of the environment, but rather a procedure which stops development at a not-yet present danger period and then, when favorable conditions again appear to be present, allows the larvae to continue to develop.

Compendium of Entomological Methods—Part II—Orthoptera, by Irving J. Cantrall and others. Pp. 1–26 and figures not numbered. Ward's Natural Science Establishment, Rochester, N. Y. 1941.

As Ward's say in the title-page, this pamphlet is "published in the service of entomology." It is one of those needed things of which there are so sadly few. Collecting of all kinds is largely a matter of personal experience; and every set of directions for any given order is always to be construed in the light of such experience. Still, anyone of us, no matter how great his experience, is always finding new situations or conditions distinct from what has gone before. Now, Dr. Cantrall's Notes add materially to Banks' old "Directions"; they are specific and plain. Starting with the collecting apparatus, the Notes end with ways of keeping records and studying living specimens.

Of course, every reader and user of these Notes who collects Orthoptera has his own pet methods and gadgets, but it never yet hurt anyone to know how the other fellow does it. Even hard-boiled heteropterists may con this useful paper with profit.

And Ward's is to be congratulated on producing this "Compendium." J. R. T.-B.

A METHOD OF COLLECTING AND TRANSPORTING CONE-NOSED BUGS.

By Sherwin F. Wood, Los Angeles, Calif.

During investigations on the distribution of *Trypanosoma cruzi* Chagas, the causative agent of Chagas' disease, in southwestern United States, the writer has collected over 2000 *Triatoma* spp. (Hemiptera, Reduviidae) in the past eight years (Wood, 1941). Most of these insects were obtained from the nests of wood rats (*Neotoma* spp.) and have been carried alive to the laboratory from distances of a few to over 1000 miles.

The mounds of twigs, sticks, cow chips, cactus pads, and other building materials used by the rats were pulled down with a geologist's pick and raked over a level stretch of ground. In this way, the insects can be spotted easily as they move about on a twig, crawl out of the debris, or attempt to run for cover. The movements of *Triatoma* are very different from those of other insects found in the nests. After an initial quiescent period, they move to cover more or less rapidly depending upon the temperature. The slow, steady movement of most bugs toward some darkened region of the environment suggests a negative phototropism to daylight. Persistent search of pack rat nests in different localities has yielded the following species: *Triatoma protracta* (Uhler), *T. protracta woodi* Usinger, *T. rubida* (Uhler), *T. gerstaeckeri* (Stål), *T. heidemanni* Neiva, *T. indictiva* Neiva, *T. sanguisuga* Leconte, and *Paratriatoma hirsuta* Barber. Adult cone-nosed bugs were found mostly among the material immediately around the inner grass nest where the rat sleeps in the daytime but have been taken in any dark part of the nest. Nymphs, which are more abundant than adults in the nests, were found closer to the inner grass nest material of the rat. The smallest nymphs were either in the grass nest material or very close to it. From 451 wood rat nests, the average number collected for all species was 2.88 bugs per nest.

At first many insects died because of confinement in unsuitable containers. A light-weight container which would withstand moisture was needed. Glass jars used in the laboratory for cultures of *Triatoma* are too heavy to carry in large numbers, along with other equipment, either in a car or on one's person. Also the insects' need for moisture (or the coolness produced by it) proved thin cardboard boxes or drug cartons to be too fragile. This led to the use of a carton consisting of a heavy cardboard mailing tube two inches in diameter and three inches deep with two side windows, tin bottom and tin screw-cap top (Fig. 1). These cartons were purchased from the Gates Paper Co., Ltd., Los Angeles. The side windows (A) may be of variable size or shape and are easily made with a coping saw. The remaining strips of heavy cardboard (B) are ample support for the carton. The tube is lined with a cylinder of #40 brass screen or ordinary window screen (or both for added strength) securely fastened to the cardboard supports on each side by #24 annealed, tinned wire. The wire is inserted through the screen so as not to enlarge the holes in it and is tightened up enough to keep the screen in place without pulling it away from the carton wall. The wires are then pressed firmly against the screen-covered inner wall of the carton so as to follow its curvature. The approximate cost of materials per hundred cartons was 11 cents each.

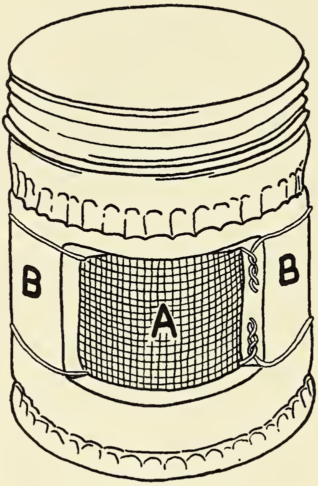

FIG. 1

Disadvantages of this container are that the tin heats up if the cartons are left in the sun, and the metal will rust in prolonged contact with moisture.

Advantages of this container are that it is light in weight, compact, sturdy, well ventilated, and water resistant. Because of the wide mouth, insects can be put in or removed easily with forceps. The screen windows make the contents visible without removing the cap. The rough inner lining offers a clinging surface, minimizing damage to the insects in transit, and the fine screen confines eggs, nymphs or larvae. The small size makes it easily transportable and affords use of separate cartons for each locality. The tin screw-cap lid is not easily dislodged and ink notations can be made upon it and later rubbed off. For absorbing fecal material of *Triatoma,* double paper toweling discs to cover the bottom and an upright accordian-pleated piece of toweling are placed in each carton.

Loss of bugs in transit during extremely hot, summer weather is reduced if the cartons are placed in a hardware cloth basket and covered with wet cloths.

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METHODS OF COLLECTING AND MARKING LARGE NUMBERS OF BEETLES.

By R. W. Williams, Urbana, Ill.

During the summer of 1940 I had the opportunity to study some of the habits of the common milkweed beetle, *Tetraopes tetrophthalmus* (Forst.). In the course of this study I found it desirable to collect large numbers of the adult beetles in the field, bring them into the laboratory, mark them and return them to the same patch of milkweed.

In collecting a large number of these insects I soon learned that it was disastrous, both to my experiment and to the beetles, to confine a large number of active adults in too small a space, for they vigorously attacked each other with their mandibles and many suffered the loss of legs and antennae. To prevent injury of this nature two procedures were followed: (1) Overcrowded conditions were avoided by placing not more than ten beetles in each of several pint fruit jars containing strips of towel paper. This method proved to be rather cumbersome and awkward, but the results were very satisfactory. (2) The beetles were cooled to such a point that they became inactive. A thermos bottle was filled with ice and water after which a large test tube, the same length as the interior of the bottle and the same diameter as the neck of the bottle, was placed into it. The insects were placed in the dry tube surrounded by the ice, the tube corked and the bottle sealed. Because of the decrease in the temperature and consequently metabolic rate, the insects soon became motionless. The later method had two decided advantages over the former. First a small size thermos bottle, which conveniently held 200 beetles, was much more portable than twenty pint jars, and second the beetles could not attempt to escape while marking and consequently there was no danger of any wandering off into the room.

Baer Brothers M Bronzing Liquid with Bruin Brand Pigments were used in marking the beetles. A gold dot on the anterior half of an elytron signified the number one, on the posterior half the number two. A green dot in the same locations represented the numbers three and four; silver, five and six; blue, seven and eight; and purple, nine and zero. In this manner the beetles could be numbered consecutively up to one hundred. The second hundred was done in the same manner with the addition of a gold dot on the prothorax, the third hundred had a green dot on the prothorax, etc., with the other colors in sequence named above. By this method of marking each individual had its own number and could be recognized as an individual in the field. These marks were quite interpretable three weeks later and I believe they would still have been so after being exposed to the elements a week or two more.

A NEW SPECIES OF PTERODONTIA (DIPTERA, ACROCERIDAE).

By Geo. Steyskal, Detroit, Mich.

Pterodontia flavoscutellata, n. sp.

> Body black, covered with black pile, the following parts yellow: scutellum, abdomen except the first and second tergites and a square area occupying the whole length of the third segment, front femora and all tibiae and tarsi. The venter is pitchy black. Length of body, also wings, 9 mm.

Holotype, male, State Game Refuge, Iosco County, Mich., July 23, 1935 (A. L. Olson—L. K. Gloyd), in Univ. Mich. Mus. Zool. This form is mentioned as an unnamed variety of *P. misella* O. S. in Cole's Revision but it seems desirable to consider it a distinct species until more is known about it.

PARASITISM IN PAPAIPEMA PURPURIFASCIA.

By Edward F. Lustig, Chicago, Ill.

On July 4, 1927, near Bristol, Indiana, a diligent search was made for *P. purpurifascia,* in the roots of Columbine, with no success. In 1928 on the same date the results were the same. In 1929, on July 4, two infested plants were found with vacated galleries.

On July 4, 1930, a healthy Columbine plant was almost rare. In about two hours work 54 larvae of *P. purpurifascia* were collected. Many vacant galleries were found and many plants were completely killed. It took longer to collect good roots for transferring the larvae than to collect the larvae.

These 54 larvae continued to eat for a few days but not as voraciously as is characteristic of the species. This was indicated by the small amount of frass, though the plants in which they were found were completely gutted. Thinking that the larvae had pupated when eating indications ceased, no attention was given them until July 10, when a cluster of parasite cocoons developed near the entrance of one of the galleries. Investigation soon disclosed that 53 of the larvae were parasitized. Only one pupated. After the formation of the parasite cocoons the larvae were still alive, though greatly reduced in length and about two-thirds of their original thickness. The first one died on July 16 and the last on the 21st. The imago from this one pupa fouled its right wings in a slit of the pupa and was unfit for mounting. Results: Interesting study. Specimens, none.

In 1931, on July 4, no larvae were found. Not even an infested plant. In 1932 search again was made. This time on June 8, when a heavy rain stopped operations after four larvae were collected. Then again on July 4 after a half day's work seven larvae were taken. One of the four taken June 8 was tightly pinched in a tiny hole through the tip of the root through which it tried to force its way. This larva was very weak when found, refused to eat in a new gallery, and died two days later. The other three left the galleries, one on June 22 and the other two on June 25. Only one of these three ate to any great extent. Of the seven taken on July 4 all were parasitized again. Those of June 8 pupated and emerged in due time.

It appears that parasitism prolongs the life of the larva and they live beyond their regular pupation period. Of the 61 larvae taken in two different years, 60 were parasitized. From the meager one-year data it would appear that pupation takes place about the third week in June in this locality. The question is: When does parasitization take place?

BOOK NOTES.

Embryology of Insects and Myriopods, By O. A. Johanssen and F. H. Butt. Pp. i–xi + 1–462, figs. 1–370. McGraw-Hill Book Company, Inc., N. Y. 1940. $5.00.

This is another of those important general works on entomology published by the McGraw-Hill Co. Whatever else it may be, it is the latest in its particular restricted field; and is sure to reflect the most recent aspects and findings in arthropodan embryology. The long experience of the senior author is assurance of its accuracy; it is the fruit of his teaching of the subject over many years. The Preface is evidence that the authors have striven for impartiality in dealing with controversial questions. In others words, they are objective in their treatment.

The work is divided into two parts. The first (Chaps. I–XII) takes up the subject from the general standpoint, beginning with ontogenetic development, the cell, and types of cleavage in the animal egg. It goes on through the type of embryonic development in insects to polyembryony, parthenogenesis, microörganisms in the egg and to the methods of experimental embryology. The second part, embracing chapters XIII to XXI, takes up the types of insects by Orders, from the collembola through the Diptera, with a last chapter on the Myriapods. At the end is a Bibliography of 49 pages and an Index of 8 pages.

The work is in effect a true source-book. The extended bibliography indicates the vast amount of work compressed into the pages of this one book. Necessarily, minor and minute details will be in the various monographs and separate studies cited. The main picture, however, is thoroughly covered and clearly presented.

To embryologists in general, this is a fine contribution. Students of insects in their general aspect and even specialists, will need it at hand for consultation, especially such of them as are evolutionary taxonomists.

Insetos do Brasil—2° tomo—Hemipteros, by A. da Costa Lima. Pp. 1–351, figs. 2–441. Escola Nacional de Agronomia, serie didactica n. 3. Rio de Janeiro, Brasil.

Dr. da Costa Lima in this second volume of his work covers *only* the Heteroptera (or Hemiptera proper). The Homoptera are reserved for another volume. The work is one of a series apparently on a somewhat similar plan to Britton's series on the insects of Connecticut, although not as detailed. While the Hemiptera of Connecticut gave keys to species, the book now discussed seldom goes beyond keys to genera, and not always so far. On the other hand, the original illustrations, both of insects and their structures are more numerous, both line figures and photographs.

The book as a whole forms chapter XXII of the general work. It begins with a general section on morphology, biology and classification, and it goes on with a section on each superfamily (sec. Reuter), with subsections on the families. Great stress is laid in these on the biology and the economic importance of the species mentioned. This is especially notable in the Triatominae. Each section is followed by an extensive bibliography, although I notice omissions of United States work in some of them. The 15 page index gives scientific and popular names (Brazilian) for many of the economic species; and the same for plants.

It is, perhaps, unfortunate for us in this country that it should be in Portuguese, a language practically as unknown here as Chinese, in spite of our much-publicized Pan Americanism. I can almost hear someone say "It's too bad they can't write their books in a civilized language!"

But the hard fact remains that it is a most important work, full of new data of all kinds. Our own hemipterists will find it of great interest and use.

Our warmest praise and congratulations go to Dr. da Costa Lima for this outstanding work.

A Check List of the Fleas of the Pacific Northwest. Pacific University Bulletin, *37*, No. 4, November 1940.

A Review of the Fleas of the Genus Meringis with Two New Species. Pacific University Bulletin, *37*, No. 5, November 1940.

A Review of the Western Fleas of the Genus Malareus with One New Species and the Description of a New Thrassis from Nevada. Pacific University Bulletin, *37*, No. 6, December 1940; all by C. Andresen Hubbard, Sc.D.

In these three papers, Dr. Hubbard publishes some further results of his studies of West Coast fleas. His check list names 90 species of fleas, most of the records having been taken from specimens collected by him. Twenty-seven additional species are listed from California south of San Francisco Bay. With Hubbard's descriptions of two new species of *Meringis, M. walkeri,* and *M. jewetti,* both from *Perognathus parvus,* the genus now contains eight species from this region. The new species of *Malaraeus* is *M. dobbsi,* off *Microtus oregoni,* and three other species of that genus are reviewed. *Thrassis jellisoni,* closely related to *T. pandorae,* is described from *Citellus oregonus.* Both "Reviews" are based on long series of specimens and contain clear illustrations of the important characters of the species under consideration. H. F. Fuller.

An Introduction to Entomology, by John Henry Comstock. Ninth edition revised by Glenn W. Herrick. 8vo., cloth, 1064 pp., 1228 illus., Ithaca, N. Y., Comstock Pub. Co., 1940, $5.00.

This book in its various previously issued editions has become internationally known and used. The public therefore already has sufficient familiarity with its general scope and subdivisions so that it is not necessary here in view of space limitations to do other than indicate noteworthy changes made in this latest edition. These are not extensive since they comprise only the revision and extension of the discussion of the superfamilies Ichneumonidea, Proctotrupoidea and Chalcidoidea groups which contain many important parasites. In addition a shorter key to the commoner families of the suborder Clistogastra, together with keys to the subfamilies of the Ichneumonidae and Chalcididae have been added. The text for the keys and for the new matter on the parasitic Hymenoptera has been contributed by Dr. Harry K. Townes, who has given much study to these groups. It is believed that these keys and the added material on Hymenoptera will enhance the value of the book to students of entomology, and will prove particularly helpful to those interested in parasitic forms. J. S. W.

Biology and Morphology of Some North American Bittacidae (Order Mecoptera). By L. R. Setty. The American Midland Naturalist, vol. 23: 257–353. 1940. $1.—paper.

This is a much-needed study of the life-histories, habits and morphology of *Bittacus pilicornis, occidentalis, strigosus, stigmaterus,* and *punctiger,* with some notes on *apicalis.* Since almost nothing has been previously published on the biology of the North American Bittacidae, or of any of the Mecoptera, for that matter, this is an extensive contribution to our knowledge. Dr. Setty is to be congratulated on the development of a technique which has enabled him to rear so many species. The morphological portion of the present work deals with both gross anatomy and histology of larvae, pupae and adults.—F. M. Carpenter, Cambridge, Mass.

PROCEEDINGS OF THE SOCIETY.

Meeting of December 12, 1940.

A regular meeting of the Brooklyn Entomological Society was held at the Brooklyn Museum on Thursday, December 12, 1940, at 8:00 P.M. President William T. Davis presided, and nine other members were present, namely, Messrs. Buchholz, Engelhardt, Gaul, Malkin, McElvare, Naumann, Pallister, Siepmann and Teale; also, Messrs. Frederic V. Clark, I. Earl Ehrenreich, Morris Gelman, Morris Schwartz, Daniel Sherry, and Mrs. Pallister.

The minutes of the previous meeting were read and approved. Mr. Davis appointed a nominating committee to consist of Messrs. Teale, Gaul and Shoemaker.

Mr. Engelhardt presented an informal treasurer's report, indicating a satisfactory financial condition. He also said that sufficient manuscript was on hand for the society's publications.

Mr. John C. Pallister, 2501 Knapp Street, Yacht Marion II, Brooklyn, N. Y., was proposed for membership by Mr. Davis. The by-laws were suspended and Mr. Pallister was duly elected to membership.

The secretary read a letter from Mr. Lionel Lacey who resigned as a member of the society. His resignation was accepted, and Mr. Engelhardt volunteered to inform him of this action, and to express the regrets of the society.

Mr. Engelhardt reported that Dr. George S. Tulloch was now in Brazil doing some mosquito work for the Rockefeller Foundation. A search is being made for the species responsible for the jungle type of yellow fever, the vector being known only for the urban type.

Mr. Pallister showed specimens of Elateridae of the genus *Semiodus.* They are of interest because of their long slender form and bright colors. The American Museum of Natural History has 25 of the 90 known species. They occur chiefly in South America, their distribution centering around Ecuador and Northern Peru. Three species extend into Mexico.

Mr. Davis showed some skunk pellets obtained near Oakwood, Staten Island, containing wild cherry pits, and parts of cicadas, hornets and other insects, indicating that the skunks raid the burrows of the Cicada Killer.

The speaker for the evening was Mr. Albro Tilton Gaul, who spoke on "Some Aspects of the Parasitic Hymenoptera."

Mr. Gaul called attention to the fact that a true parasite does not kill its host. The Hymenopterous parasites generally kill their host, and are properly called parasitoids.

The parasitic Hymenoptera are not a taxonomic group, but consist of a number of families taxonomically diversified, embracing about half of the Hymenoptera. Thus, in New England, there are about 1400 species of Hymenoptera which are parasitic, compared with about 500 saw flies, 500 solitary wasps and bees, and 100 social species.

In typical Hymenopterous parasitoids, the female deposits her eggs in, on or near the host. The egg develops into a larva which devours the tissue of the host. The fat body is consumed first, the vital parts last. The larva is simply a predatory insect, eating the food nearest at hand, while the adult is a free living insect with a complex of instincts necessary for the selection of a host and the disposition of her eggs. With these reproductive instincts there is often a close association of the hunger instinct. In some Chalcid flies, for instance, the female stings her host and oviposits; then she backs up and licks the juices issuing from the puncture.

The sting in the parasitoids has a threefold purpose; it protects the individual, it paralyzes the prey, and it has an antiseptic effect, preventing the decomposition of the host.

Parasites undergo certain modifications adapting them to the parasitic life. In general, there is a simplification of anatomy and an increased reproductive ability. This is true of tapeworms and other true parasites, as well as of the parasitoids.

In the Hymenopterous parasitoids the simplification is mostly in the larva. The mouth parts and the head capsule are small. The abdominal muscles are weak, the larval abdomen swelling to accomodate food. Legs are vestigial. The tracheae are reduced, particularly in the endoparasitic forms. In young larvae of some species, there is only a network of capillaries, the oxygen being absorbed from the blood of the host. The only noteworthy simplification in the adult parasitoid is in the wing venation.

As is general among insects, the more complex the adult, the more primitive the larva.

The reproductive ability of the parasitoid Hymenoptera is generally increased. In most species parthenogenesis exists, usually supplying males for the next season. In some cases, the male is rare and useless.

Polyembryony, in which a normal egg divides into two or more cells, each of which forms a separate individual, also occurs. The number of individuals from a single egg often depends upon the size of the host. In *Platygaster,* one, two or four individuals may develop from a single egg. In *Copidosoma* a parasite on the goldenrod moth, the average is 163 individuals from a single egg.

Very few parasites are restricted to a single species or a single genus as a host, but the range of hosts varies. The parasites frequent the food plant of the host, but when an introduced pest appears in a new locality, the food plant is often changed, while introduced parasites may frequent the original or other food plants.

Mr. Gaul briefly described how the present forms of Hymenoptera might have evolved from primitive phytophagous forms.

The Oryssidae, a family of sawflies, are the first group of parasites discussed; they are ectoparasites on Buprestid beetles.

Among the Ichneumonidae were discussed such ectoparasites as *Megarhyssa, Polysphincta, Paniscus* and *Grotea* and the endoparasitic forms, the Ephialtini, *Amblyteles, Ophion, Therion* and *Diplazon.*

The Braconids, *Aphidius* and *Microbracon,* the Evanidae, Pelecinidae, Scelionidae, Figitidae, Ibaliinae, Perilampidae and Pteromalidae as well as the Mymaridae were mentioned to illustrate various types of relationships. These represented hypermetamorphosis, hyperparasitism, reinfestation (*Mellittobia*), phoresy, and variations from the parasitic existence to the phytophagous. Life histories of all these forms were treated.

Mr. Davis called attention to Mr. Leng's illness. Mr. Leng is the only surviving incorporator of the Brooklyn Entomological Society in 1885, and was also an incorporator in 1936.

The meeting adjourned at 10:15 P.M.

Carl Geo. Siepmann,
Secretary.

I AM AN ENTOMOLOGIST.

I am an Entomologist,
And as good as I can be
And if you have a problem list,
You can always count on me.
I can make all the buggies squirm
From cricket to bumble bee,
And if you have a bad snail or worm,
You can always count on me.

Dan Toland, age 11, Alhambra, Calif.

EXCHANGES

This one page is intended only for wants and exchanges, not for advertisements of articles for sale. Notices not exceeding THREE lines free to subscribers. Over lines charged for at 15 cents per line per insertion.

Old notices will be discontinued as space for new ones is needed.

DIURNAL LEPIDOPTERA.—Have many desirable western species to exchange, including *Argynnis atossa, macaria, mormonia, malcolmi, nokomis; Melitaea neumoegeni; Lycaena speciosa;* etc. Send lists. Dr. John A. Comstock, Los Angeles Museum, Exposition Park, Los Angeles, Calif.

BUY OR EXCHANGE: Pinned Microlepidoptera and papered Pieridae of North America. Full data with all specimens. Named material of all groups offered. Alexander B. Klots, College of the City of New York, New York City.

EXCHANGE OR FOR SALE.—*Catocala herodias* (Gerhardi), *Graptolitha viridipallens* and others. Wanted: Rare N. A. Macro-Lepidoptera. F. Lemmer, Lakehurst, N. J.

WANTED.—North American CHRYSIDIDAE for exchange or determination, with privilege of retaining duplicates. W. G. Bodenstein, Dept. Entomology, Cornell University, Ithaca, New York.

PENTATOMIDAE: Want to buy or exchange Petatomidae from the United States and Mexico. Herbert Ruckes, College of the City of New York, 17 Lexington Ave. N.Y.C.

ACALYPTRATE DIPTERA OF THE WORLD wanted for determination or in exchange for other insects. Geo. Steyskal, 23341 Puritan Ave., Detroit, Mich.

LOCALITY LABELS.—3½ or 4 point type; 40c per five hundred, 60c per thousand, 40c for each additional thousand, same type. Type labels on colored paper 10c extra. Good paper, clean work, no trimming. The Nature Co., Box 388, Lawrence, Kansas.

LEPIDOPTERA COLLECTION.—Excellent condition, fine representation of named N. A. Diurnals and Nocturnals. Also choice selections of tropical Papilios, Sphingiids and Saturniids. Hy. J. Dietz, 3053 Hull Ave., New York, N. Y.

WILL COLLECT Arizona insects, all orders. Write to Margery Stegmeier, 2578 North Oracle Road, Tucson, Ariz.

Vol. XXXVI OCTOBER, 1941 No. 4

BULLETIN

OF THE

BROOKLYN ENTOMOLOGICAL SOCIETY

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SEP 8 1941
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CARL GEO. SIEPMANN GEO. P. ENGELHARDT

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The Brooklyn Entomological Society

Meetings are held on the second Thursday after the first Tuesday of each month from October to June, inclusive, at the Central Museum, Eastern Parkway and Washington Ave., Brooklyn. The annual dues are $2.00.

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BULLETIN

OF THE

BROOKLYN ENTOMOLOGICAL SOCIETY

Vol. XXXVI October, 1941 No. 4

THE PREPARATION OF SLIDES OF THE GENITALIA OF LEPIDOPTERA.

By J. F. Gates Clarke, Washington, D. C.

Within the past 4 years I have had numerous requests from students and technicians for a paper dealing with the method employed in the Bureau of Entomology and Plant Quarantine, United States Department of Agriculture, in the preparation of the slides of the genitalia of Lepidoptera.

In this paper I am describing in detail the procedure followed and am listing convenient equipment which may be modified according to the wishes of those who follow this method. It is not my object in this paper to discuss other methods, some of which are highly satisfactory, but merely to set forth the method of procedure which has proved satisfactory in the preparation of well over 30,000 slides of genitalia now housed in the Division of Insects of the United States National Museum.

Equipment.

The equipment used is simple, and falls into two classes, (1) mechanical and (2) chemical. It is assumed, of course, that the operator owns, or has access to, a dissecting microscope and essential accessories.

Suitable implements and other equipment are as follows: Three 4-ounce dropper bottles for reagents; six to twelve 3-inch test tubes, corks, pins, and rack; one 2-ounce glass-stoppered bottle for dye and one 2-ounce jar for balsam. Two types of watch glasses are convenient, the Syracuse watch glass (four) for washing and dissecting, and the small Bureau of Plant Industry watch glass (about ten or twelve) for clearing. Two scalpels with triangular outline and sharp cutting edge, two dissecting needles, two fine hooks, small flexible forceps, and two or three camel's-hair brushes of different small sizes are necessary. If desired, these brushes

SEP 8 - [illegible]

may be trimmed to give shorter bristles and truncate ends but the trimming of the brushes is entirely a matter of choice. Both types of brushes are used by Bureau lepidopterists. The above may be supplemented by a small syringe, made from a hypodermic needle and fitted with a rubber bulb from a medicine dropper, used to force extraneous matter from the abdomen. In addition, a suitable supply of hollow-ground microscope slides, cover glasses (18 and 22 mm.), and rings of various thicknesses is essential. The hooks can be made by inserting small insect pins (No. 0 or minuten nadeln) in the ends of small sticks or of small camel's-hair brushes from which the hairs have been removed. The points of the pins are then bent to form the desired hooks. The rings are made of "bakelite" or hard vulcanized fiber, and can be obtained in the form of tubing three-quarters of an inch (19 mm.) in diameter, outside measurement. The tubing must then be cut, with a lathe, into the desired thicknesses. Other types of rings, already prepared, are on the market and can be obtained for a small sum.

The chemicals or reagents used are few, inexpensive, and easily obtained. They consist of an adequate supply of 95% alcohol, xylene (xylol), Canada balsam, oil of cloves, a 0.5% solution of mercurochrome, a 10% solution of potassium hydroxide (KOH) in 50% alcohol, and plenty of water.

The 50% solution of alcohol is used in the preparation of the 10% solution of potassium hydroxide, to increase the wetting power.

The 0.5% solution of mercurochrome, used for staining the tissues, is prepared by dissolving one mercurochrome tablet (4.6 gr.) in 2 ounces of distilled water. It is advisable to use distilled water in the preparation of the stain to eliminate the rare chance of a chemical reaction with the mercurochrome. Under ordinary circumstances, however, ordinary tap water will serve.

The best results in mounting the genitalia will be obtained by thinning the Canada balsam with xylene. Thick, viscid balsam is difficult to handle and slows up the procedure.

PROCEDURE.

In selecting specimens for dissection it is well to follow a few established rules.

(1) Select topotypes (specimens from the type locality) or homotypes (specimens compared with types) when possible, or

(2) Select specimens in good condition to assure correct specific identity, or (3) select a male and a female from the same

locality if the series is small or males and females from different localities, to include all variations of a species, if the series is large.

A word of caution here: Any specimen with the abdomen glued on should be distrusted. Unless such a specimen is marked with a label, indicating that the correct abdomen is attached, it should not be used for genitalic studies.

When the specimen for dissection has been selected, the next step is the preparation of the labels. Two labels are needed, one a small, permanent label (fig. 4) to be attached to the pin on which the specimen is mounted, the other a temporary slip (fig. 2) which is attached to the cork of the test tube containing the soaking abdomen. The first bears the notation that the genitalia are on a slide, the date of preparation, and the slide number; the second, which is discarded after the permanent slide labels are made, shows the essential data to be recorded on the slide labels. This temporary label bears a number, corresponding to that on the label attached to the insect. The number will be transferred to the slide later.

To remove the abdomen of the specimen all that is usually necessary is a slight pressure on the underside which causes it to break off. Occasionally if care is not exercised, the breaking point will come between the meso- and metathorax. This can be avoided by applying counter pressure with a stout dissecting needle, or the point of one of the small scapels, to the suture (dorsal) between the metathorax and the first abdominal segment. Cutting the abdomen posterior to the first abdominal segment is not advised, because characters of important taxonomic value are frequently found on this segment. If, after the dissection of a specimen of a large species, it is found that the first, or subsequent segments, have no characters of taxonomic value, then the abdomen may be cut to reduce the space consumed on the slide. After removal, the abdomen is dropped into one of the test tubes of the 10% KOH, where it is allowed to remain from 2 or 3 (small microlepidoptera) to 24 hours (Geometridae, Phalaenidae, most Rhopalocera, and the majority of the microlepidoptera), depending on the size of the specimen. In some groups (Sphingidae, Bombycidae, etc.) the abdomen should soak for 48 hours.

After the abdomen has soaked long enough to dissolve most of the tissues (except the sclerotized parts) it is removed and placed in a watch glass of water (Syracuse). In this step the extraneous matter is forced from the abdomen, the scales are removed with one of the camel's-hair brushes, and all the excess potassium hydroxide is washed out. At this point the small syringe may be used to force the undesired material from the abdomen. Then the intersegmental membrane between the eighth abdominal segment if male, or seventh if female, and the genitalia is cut and the latter removed. Any foreign matter remaining in the abdomen or bits of tissue remaining attached to the genitalia are now eliminated. If any scales remain attached to the abdomen they can be removed later in the alcohol wash.

The abdomen and genitalia are now ready for staining. The stain is made by putting a few drops of the stock solution of dye (0.5% solution of mercurochrome) into a watch glass of water. Here the dissected parts are allowed to remain until stained to suit. Care should be taken not to permit the tissues to become too dark. A faint pink color is desirable but no more. The lightly sclerotized parts are more sensitive to the dye than those which are strongly sclerotized. If the genitalia are permitted to remain in the stain too long the membranous areas become dark and many essential details may be obscured. The membranous parts should be stained lightly, however, to eliminate the possibility of their disappearance in the balsam.

After staining, transfer the parts to a watch glass of 95% alcohol to remove excess dye and to dehydrate. In this wash it is possible to remove any remaining scales and to clean up any extraneous matter or ragged edges. If the genitalia are from male specimens they are spread (if symmetrical) at this time.

When the alcohol wash and dehydration have been completed the genitalia and abdomen are removed and placed in one of the small watch glasses containing oil of cloves. The oil will clear and harden the parts so that they will retain the desired shape and position obtained in the preceding alcohol wash. If oil of cloves is not available cedar oil may be substituted.

The genitalia are allowed to remain in the oil until clear and then transferred to a large watch glass of xylol (xylene), where the excess oil is washed off. At this point the aedeagus may be removed (if desired) although this may also be done equally well in the alcohol before clearing in oil.

Now the genitalia are ready for mounting. On a slide, previously cleaned, place a drop or two of the balsam. Into this introduce the genitalia and abdomen, and arrange as indicated in figure 5 if a male, and figure 6 if a female. This arrangement may be modified according to the size of the parts. If small, the genitalia and abdomen can be placed together under a single cover glass, but if large the genitalia should be mounted separately, with the abdomen at one side (fig. 3). When the genitalia are in position a cover glass is placed over them. Rings (figs. 3, 5, and 6) are used to support the cover glass only when the genitalia are too thick to permit mounting without distortion.

In all cases where large genitalia are mounted it will be necessary to use rings to give sufficient depth to the balsam to accommodate the parts. Rings of various thicknesses will be necessary for these mounts (figs. 5, 6). The genitalia should never be pressed down and flattened, for this always distorts or breaks them.

Uniformity in mounting of the genitalia cannot be too strongly stressed. The position of the various parts of the genitalia of a given group should be the same for purposes of comparison. What applies to one group perhaps will not apply to another. For example: In group "A" (figs. 7, 8) the genitalia may be shown to the best advantage spread (male) and from the ventral side; in group "B" (figs. 10, 14) it may be better to expose them in the lateral view or to dissect them. In the Crambidae (fig. 16) the harpes show to the best advantage dissected and in ventral view, while the tegumen, uncus, and gnathos show to the best advantage from the side. Most of the Phalaenidae (both males and females) may be seen best in ventral view, but not a few require mounting in lateral aspect. The genitalia of most microlepidoptera should be mounted to show the ventral side, but those of male Gelechiidae (fig. 17) and a few others can be observed best usually in lateral or three-quarters aspect.

In figure 24 I have illustrated an example of a preparation in which "drifting" has occurred. To avoid drifting three rules should be observed.

(1) Avoid the use of thick, viscid balsam.

(2) Insure the rapid "flowing on" of the cover glass; if necessary, by touching the edge of the cover glass in xylol.

(3) Do not place slides on edge while fresh.

The genitalia in fresh preparations will always drift if the slide is placed on edge. Slides frequently require several months to harden, if they are thick, so it is always advisable to house them in a horizontal position. Slides may be hardened more rapidly by placing them in an oven or on a radiator. This method of hardening slides, however, often discolors them. It is most desirable to permit hardening to take place slowly.

If drifting does take place in spite of all precautions, the genitalia may be replaced in their proper positions by introducing a minuten nadeln pin, or a bristle, into the balsam from underneath the cover glass. The mounted parts can then be moved, with the end of the pin or bristle, into the desired positions.

When possible it is advisable to make more than one slide of a species (the more the better) and to mount one or two in different positions from the usual.

No one should be satisfied with anything less than the best slide that it is possible to make. It is not enough that one is able to recognize the parts and make identifications. The slide should be made carefully enough to photograph without distortion so that in the reproduction there will be found a true display of the characters.

In this connection I should like to quote from an editorial by Carl Heinrich (Proc. Ent. Soc. Washington, vol. 26 (1), p. 25, 1924). ". . . We want specimens, and particularly we want specimens with a history. The field workers should supply them. They frequently do not. Two common excuses are offered for this failure: the worker has no time to devote to preserving specimens, or he is not able to prepare them properly—this last more frequently in the case of the smaller Lepidoptera. The first of these is not true. If one can afford time for an experiment, he can afford time to carry it on carefully. The second is no excuse at all. It is a confession. It puts one in the class with the carpenter who cannot drive a nail or use a saw. No entomologist is worthy of the name who cannot make decent preparations—slide or otherwise—of the insects he studies. An untrained schoolgirl can do it with a week's practice. A scientist should be able to do as much."

After mounting, the slides are labeled (fig. 3), the label bearing data corresponding to that on the insect. If a single mount is used the slide should bear two labels, each with half the data shown in figure 3, leaving space for any additional data that one may wish to add later. Each slide is numbered to correspond to the small label attached to the pin at the time of the removal of the abdomen.

In closing, a few remarks on the reproduction of figures of genitalia for publication may be in order.

It will be seen from the illustrations in this paper that photographs are not entirely satisfactory. Specks of dirt in the balsam detract from the appearance of the illustration; more frequently than not the genitalia are too thick to permit focusing on all parts, and thus many details are obscured; the balsam becomes dark with age, thereby clouding the illustration. These are a few of the details that militate against the photographic process.

Line drawings, reproduced as zinc etchings, are the most satisfactory, but their preparation is time-consuming and expensive. The most satisfactory way of illustrating genitalia will probably be found in the combination of photographs of entire mounts (figs. 7, 8, and 11) supplemented by drawings of essential details.

I wish to thank Mr. M. L. Foubert of the Office of Information, United States Department of Agriculture, for his painstaking care in making the illustrations for this paper. Through his knowledge of photography and helpful coöperation it has been possible to obtain photographs emphasizing the good, as well as bad, features where desired.

PLATE I

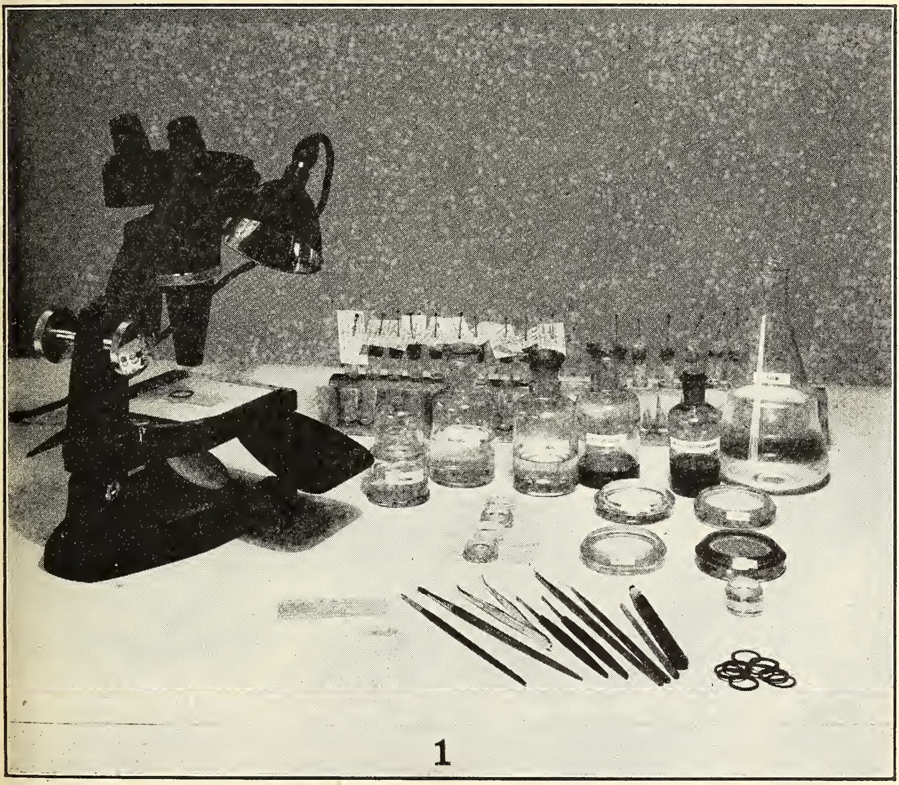
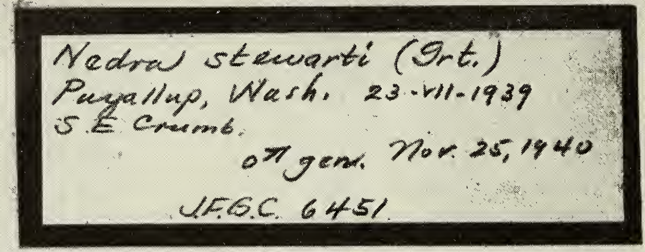


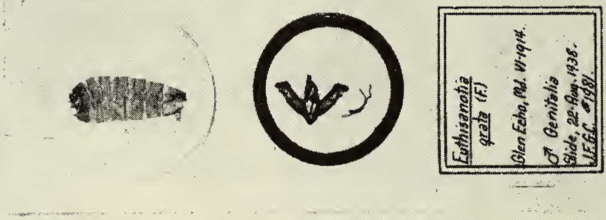
FIG. 1. Equipment used in the preparation of slides of genitalia.

Plate II.



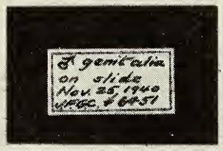
Nedra stewarti (Grt.)
Puyallup, Wash. 23-VII-1939
S.E. Crumb.
♂ gen. Nov. 25, 1940
J.F.G.C. 6451

2



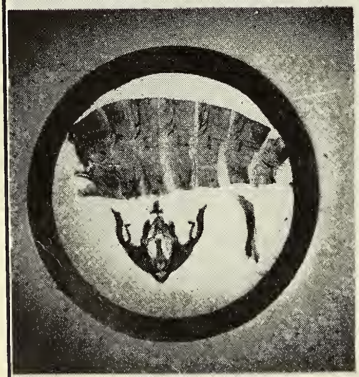
Euthisanotia
grata (F.)
Glen Echo, Md. VI-1914.
♂ Genitalia
Slide, 22-Aug.-1936.
J.F.G.C. #1981

3



♂ genitalia
on slide
Nov. 25 1940
J.F.G.C. #6451

4



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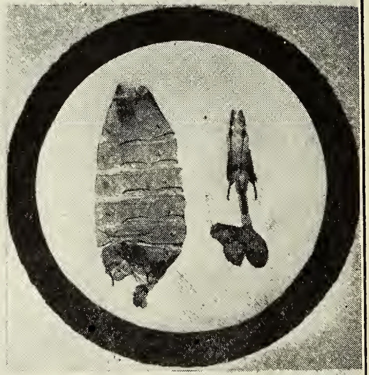

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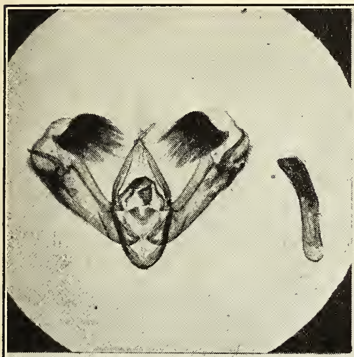
Plate III.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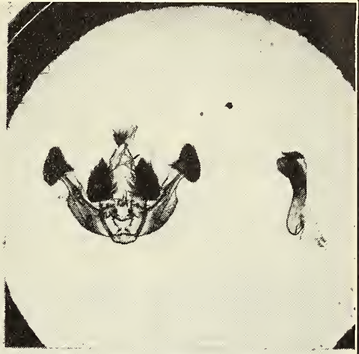
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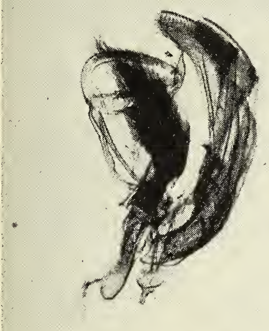
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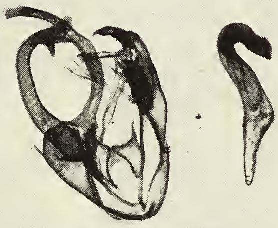
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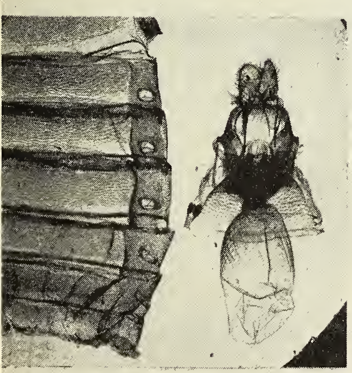
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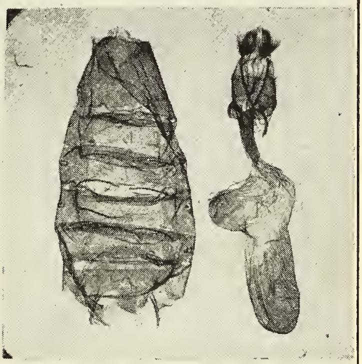
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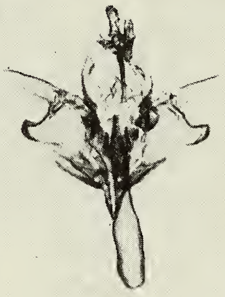
Plate IV.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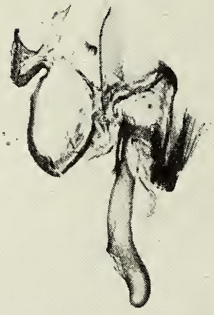
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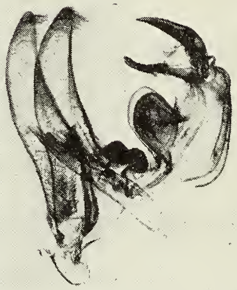
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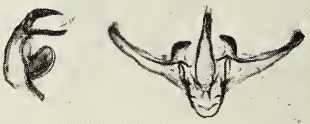
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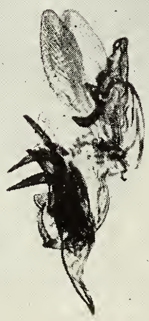
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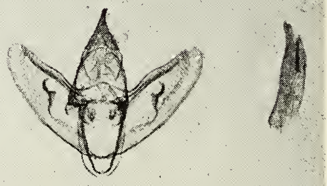
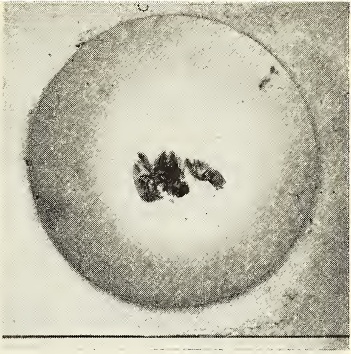

18

Plate V.

19



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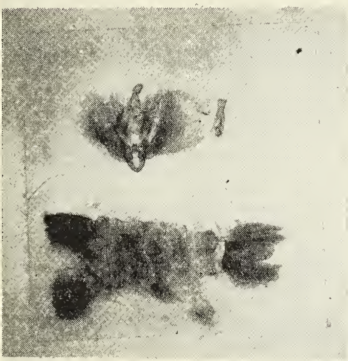

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EXPLANATION OF PLATES.

PLATE II

FIG. 2. Temporary label used during preparation of abdomen for genitalic mount.

FIG. 3. A double mount slide with single label. This type is used only when the abdomen is too large to be included within the ring with the genitalia.

FIG. 4. Small label to be attached to specimen from which the abdomen has been removed. Note that the date and number correspond to the date and number on the temporary label (fig. 2).

FIG. 5. Typical arrangement of male genitalia and denuded abdomen on single mount slide.

FIG. 6. Typical arrangement of female genitalia and denuded abdomen on single mount slide. In this case the staining of the bursa copulatrix is too dark.

PLATE III

FIG. 7. Phalaenidae: Ventral view of male genitalia with harpes spread and aedeagus removed, the latter in lateral aspect.

FIG. 8. Phalaenidae: Another mount of same type as shown in figure 7.

FIG. 9. Phalaenidae: Genitalia in lateral aspect with aedeagus *in situ*. Note the loss of detail here. This type of mount is essential, however, for obtaining a proper view of the uncus, gnathos, or other structures which are of great importance in some species, and which are obscured in a ventral mount.

FIG. 10. Phalaenidae: The asymmetrical type. Only experience will determine the kind of mount to be used but several, in different positions, are advisable.

FIG. 11. Phalaenidae: Ventral aspect of female genitalia. Note the detail of sclerites and bursa copulatrix brought out by proper staining. Note also the loss of detail, in the vicinity of the genital opening, due to the thickness of the mount.

FIG. 12. Phalaenidae: Same type as figure 11, except that this mount shows distortion through carelessness in handling.

PLATE IV

FIG. 13. Schenobiidae: Ventral aspect with aedeagus *in situ.* Note the loss of the outline of the margin of the harpe in the unstained mount.

FIG. 14. Schenobiidae: Lateral view of the same species as that in figure 13. This view shows details of the tegumen, uncus, gnathos, and vinculum.

FIG. 15. Crambidae: Lateral view with aedeagus *in situ.*

FIG. 16. Crambidae: Combination mount of the same species as that shown in figure 15. In this type of mount the genitalia are dissected and the parts are arranged in different positions to show them to the best advantage.

FIG. 17. Gelechiidae: A three-quarter mount. This type, in which the genitalia are turned slightly to one side, gives the most detail for a single position.

FIG. 18. Geometridae: Ventral view with aedeagus removed. Symmetrical types, such as this, can be shown to the best advantage in ventral aspect.

PLATE V

Examples of poorly made slides

FIG. 19. This slide is absolutely worthless for purposes of identification. All details are obscured by extraneous matter and the genitalia were mounted while wet.

FIG. 20. Another useless preparation. In this case the genitalia are broken and the details are obscured by dirt.

FIG. 21. This preparation is sufficiently well made for use in determination, but exhibits poor technic.

FIG. 22. In this case the genitalia are badly broken. This preparation can be used, but all parts show complete lack of organization.

FIG. 23. This preparation shows all necessary details but exhibits poor organization and careless technic. The abdomen is not completely denuded and contains much extraneous matter.

FIG. 24. This slide shows an example of "drifting" and sloppy technic. The essential details of the genitalia are visible and the slide is usable.

A NEW NODONOTA WITH A KEY TO THE UNITED STATES SPECIES (COLEOPTERA: CHRYSOMELIDAE).

By Burdette E. White, Merced, Calif.

A number of Chrysomelid beetles recently received by the writer for identification from Mr. Frank H. Parker included a species of *Nodonota* which is abundantly distinct from any in our fauna. This is described below as a new species. Although this is but the second of this genus to be added to our list since Schaeffer's excellent key, 1906 (Bull. Brook. Ins. 1, (9): 238–239), it appears worthwhile to present a modification of his tables to include the subsequently discovered forms. A revisional study of the *Nodonota* does not seem necessary at the present time.

Nodonota parkeri White, n. sp.

Size large, robust; color uniformly blackish-blue above; the elytra strongly elevated from base to middle, then sharply declivent to apex; humeral callosity very feeble, surface of elytra not at all costate. 4–5.5 mm. Head with faintly metallic greenish lustre, vertex moderately finely punctate, clypeus and labrum emarginate, antennae extending to middle of elytra, basal segments testaceous outer segments fuscous, segments one plus two equal in length to seventh which is equal to the ultimate, segments 3–6 and 8–10 equal in length and each four-fifths the length of the seventh, all segments gradually broadening from the 3d apically, 8th twice the width of 4th, terminal segment fusiform with apex acutely pointed. Pronotum slightly more than twice as wide as long; disk moderately and sides densely covered with medium sized punctures, entire surface alutaceous; lateral margin feebly rounding (subparallel) to middle then more strongly rounded to apical angle which ends in an acute small reflexed cusp. Scutellum impunctate, alutaceous, sides parallel in basal half, then strongly converging to apex which is obtusely subangulate. Elytra almost as wide as long, with punctures slightly larger than those of pronotum, punctures subseriate, surface smooth and more shining than pronotum and scutellum, very feebly alutaceous, umbone feebly developed. Body beneath blackish with bronze lustre, the prothoracic flanks with greenish lustre, surface strongly alutaceous, impunctate except prothoracic flanks which are similar to pronotum in sculpture;

prosternum constricted between the coxae, femora metallic as ventral surface, tibiae and tarsi fuscous. Last ventral segment emarginate at the apex with emargination filled with a strongly reflexed lobe of the pygidium, the pygidium with a longitudinal groove on its posterior surface just below the apical elytral angles. Length, 5.5 mm.; width 3.8 mm.

Type locality: Patagonia, Arizona.

Holotype, female; collected at Patagonia, Arizona, VIII–14–1935, by F. H. Parker, remains in author's collection. Five paratypes (all females) with same data as the type are deposited in the collections of F. H. Parker, the California Academy of Science, and the writer. One paratype in the R. G. Dahl collection is from Nogales, Santa Cruz Co., Ariz., IX–6–06, F. W. Nunenmacher, Collector.

Parkeri is readily separable from all our *Nodonota* by the peculiar structure of elytra which is described above as "strongly elevated from base to middle, then sharply declivent to apex." This condition greatly exceeds *convexa* Say which is a smaller blackish bronze species. In *parkeri* the elevated surface of the elytra, when viewed from the side, appears to form a subangular peak which is flattened across the apical declivous surface. This character remains constant in the series of seven specimens which vary only in size and color. The dark blue may possess a violet sheen and some specimens have the femora as well as the tibia fuscous.

This distinctive species is gratefully named in honor of Mr. Frank H. Parker of Globe, Arizona, who collected most of the representatives observed.

KEY TO THE UNITED STATES NODONOTA.

(Modified from Schaeffer, 1906)

1. Elytra with one or more distinct costiform elevations, at least in the female 2
   Both sexes without costiform elevations at sides 5
2. Sides of pronotum near base broadly and strongly rounded, meeting the basal angles in a continuous curve; color brown, bronze, or green; 4.5 mm. (Brownsville, Tex.) *rotundicollis* Schaeffer
   Sides of pronotum feebly rounded, extending nearly straight and parallel from a little behind middle to base; hind angles distinct 3
3. Form oblong, elytra with umbonal costiform elevation 4
   Form oval, convex, robust; the female with several costiform

elevations on each side of the umbone, the inner costae shorter; color bronze (or blue?); 5 mm.; (So. Arizona) *basalis* Jacoby

4. Punctures of pronotum, especially at sides, substrigose; form moderately convex; color green, blue, violet, or bronze; 4 mm. .... *puncticollis* Say

Punctures of pronotum well separated and round; color bronze; 3.25 mm. (Brownsville, Tex.) .... *texana* Schaeffer

5. Lateral margin of pronotum strongly rounded to base; pronotum widest at basal 3d 6

Lateral margin of pronotum not rounded to base; pronotum widest at base 7

6. Form more oval and convex; pronotum moderately narrower at apex than base; head finely punctate; sides of metasternum coarsely, densely punctate; color shining, blackish-bronze; size 4.25 mm. (Eastern U. S.) .. *convexa* Say

Form more elongate and more depressed; pronotum much narrower at apex than at base; head coarsely punctate; metasternum sides not or but very faintly punctate; color greenish, blue, violet, or blackish bronze; size 4 mm. (Eastern States) .... *tristis* Oliv.

7. Clypeus strongly constricted by antennal bases; form elongate, not strongly convex; color variable as above. Size 3.75 mm. (Middle and So. Eastern States) .. *clypealis* Horn

Clypeus not constricted; form robust, elytra angularly convex; color blue or blue with violet sheen; size 5 mm. (So. Arizona) .... **parkeri** White n. sp.

A REMARKABLE IMMIGRANT LEPTOPODID IN CALIFORNIA.

By Robert L. Usinger, University of California, Davis, Calif.

The Hemipterous family Leptopodidae has thus far been recorded only from the old world. *Leptopus marmoratus* was described as early as 1778 by Goeze while *Patapius spinosus* was first described as *Acanthia spinosa* by Rossi in 1790. Leptopodids have since proven to be widespread and not uncommon in the warmer parts of Europe, Asia, and Africa. The family is allied to the Saldidae but, as summarized by Horváth,[1] the ocelli are located close together on a tubercle between the eyes, the last two antennal segments are very slender, the rostrum is short, curved, the first segment as long as the head, and at least the basal segment armed with long spines, the abdominal stigmata are situated on the dorsal surface, and the anterior femora, at least, are attenuated apically and bear long spines.

On April 10, 1941, Dr. S. F. Bailey collected the first specimen of Leptopodidae ever to be recorded from the Western Hemisphere. The specimen was brought into the laboratory alive during the routine examination of tree protectors surrounding the trunks of young almond trees while searching for peach twig borer pupae. The orchard is located near Arbuckle, Colusa County, in a dry and isolated section of California. Arbuckle is on the west side of the Sacramento Valley separated from the coast by the formidable mountains of the Coast Range. It is isolated from main rail- or highway traffic. Nursery stock has not been introduced into this region for many years although about seventy-five miles distant at Chico, there is a field station of the Bureau of Plant Introduction of the United States Department of Agriculture. The tree protectors consisted of thin sheets of fibrous material which had evidently been cut from palm trunks. They were purchased from an orchard supply house in Riverside which, in turn, had imported them from Mexico. Two subsequent trips to Arbuckle failed to reveal additional specimens, either in the orchard, around the vines of a neighboring vineyard, or along a nearby stream.

The unique female specimen agrees with descriptions of *Patapius spinosus* Rossi and I am indebted to Mr. J. R. de la Torre-Bueno for the loan of European specimens which confirm this identification. The California specimen agrees in every detail with specimens from Spain and Tunis. Collectors should watch for a small Salda-like insect which is beset with long spines over most of its body including the eyes.

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[1] Horváth, G. 1911. Révision des Leptopodides. Ann. Mus. Nat. Hungarici, 9: 358–370, 5 figs.

SOME NEW SPECIES OF SYRPHIDAE.

By Frank M. Hull, University of Mississippi.

In this paper I present the description of some new Syrphid flies from South America and the West Indies. Types are in the author's collection.

Meromacrus gloriosus n. sp.

Related to *flukei* Curran but the abdomen is chiefly light orange red, the face sides are golden pollinose and the third antennal segment is blackish above.

Male. Length 14 mm. *Head:* cheeks, the middle of front and a facial stripe and the antennae light orange brown, the third joint of the latter blackish on the dorsal third, the arista pale yellow; the pile of front white, of the face yellowish, of the vertex blackish intermixed with yellow and the tomentum of the occiput sulphur yellow. The sides of the face are densely pale yellow pubescent. The third antennal joint is longer than wide. *Thorax:* mesonotum dully shining blackish, the humeri light and the scutellum light reddish-brown, the latter subtranslucent and densely short, setaceous black pilose with sparse, pale, ventral fringe. The mesonotum is marked with sulphur-yellow tomentum as follows: a large, yellow, posterior spot inside the humerus, a prominent fascia margining the transverse suture, scarcely narrowed anywhere and continued broadly over the posterior margin of the mesopleura to join a large spot of such tomentum on the upper part of the sternopleura. There is a similar fascia just before the scutellum, rather conspicuous, narrowed near the basal corners of the scutellum and continuous with similar pile on the posterior part of the post calli. The lateral margin of the mesonotum is dark brown. The pile of the disc is dense, short, stubby, black. *Abdomen:* light brownish-red, the first segment dark brown in the middle with prominent, somewhat diagonal patches of sulphur-yellow tomentum occupying most of this segment, especially its posterior borders, narrowly separated in the middle but not extending on to the lateral margins. The basal and posterior margins of the second segment are narrowly and diffusely brownish. The third segment is brownish-black in the middle, reddish on the sides with a prominent basal, marginal fascia of yellow tomentum separated in the middle, their posterior margins curved.

Fourth segment with similar, less wide, much more widely separated but conspicuous semicircular patches of yellow tomentum. The fourth segment is reddish-brown in color as is also the very elongated, rounded, lobate hypopygium. Pile of the abdomen broadly black in the middle and on the posterior margin of third and fourth segment and much less extensively on the second segment; elsewhere on those areas not covered by tomentum the pile is short and reddish-golden, becoming shining yellow on the lateral margin of all of the segments and the basal corners of the second. *Legs:* wholly pale orange with yellow pile, the ventral surface of the middle femora distally with black setae, the hind femora with black setae on the ventral distal half that becomes long and stouter near the apex. *Wings:* basal half of the wings strongly tinged with yellow on the costal, subcostal and basal cell, the distal half of the anterior margin brownish. The sinus above the loop of the third vein is clear.

Holotype: one male, Las Cruces, New Mexico, on pear blossoms; April, F. M. Hull, collector. One paratype male, same data.

Baccha currani n. sp.

Related to *cultrata* Austin, but with the fascia of third segment interrupted, the fourth segments with an additional sublateral vitta; moreover the frontal vitta in the female is much wider than in *cultrata*.

Male. Length 10.5 mm. *Head:* vertex blackish with golden pollen and black pile. The face, cheeks and the broad sides of the front yellow; the front slightly darker and with a narrow, diffuse, linear, blackish stripe down the middle expanding into a shining, bare spot above the antennae. The facial pile is white, the frontal pile black. Antennae light orange, the third joint narrowly blackish above, the pile of first and second segment long, black and copious. Occipital pile all golden except immediately behind the ocelli. *Thorax:* mesonotum dark brown with brassy reflections with three prominent, golden pollinose vittae of which the middle one is narrow anteriorly; the sides of the mesonotum except just in front of the post calli, the humeri, the meso-, pro-, ptero- and upper part of sternopleura and all the scutellum are light yellow. The scutellum is faintly brownish in the middle owing apparently to pollen and is long black pilose with black ventral fringe. *Abdomen:* flattened, the first segment yellow, except narrowly along the middle part of the posterior margin, which is blackish. The abdomen is black marked with orange brown as follows: the narrow base of the second segment, a broad continuous fascia across the middle of the second segment not quite reaching the margin, the narrow base of the third segment, a still wider middle fascia across the third segment, narrowly separated in the middle and from the sides, a widely separated, prominent, longitudinal stripe down the fourth segment, the immediate base of which is linearly produced or expanded to reach the side margin and the anterior, lateral corner of section of the vittae is obliquely produced outward to end near the lateral margin in the middle of the segment; fifth segment with a pair of prominent moderately separated vittae which are narrowly connected basally with a pair of shorter, sublateral vittae. The pile of the abdomen is abundant and black except in the extreme corners of the third segment. *Legs:* first and second pairs of legs wholly light yellow, light pilose except for a few dark hairs near the apex of the middle femora. Hind femora light yellow, brownish just before the base, again near the apex. Hind tarsi, and the tibiae light yellow except for a wide, dark brown, subbasal annulus which is blackish pilose. *Wings:* uniformly tinged with brown, the stigmal and costal cells somewhat darker.

Female: similar to the male, the front with a continuous black stripe from ocelli to just above the antennae, the pattern of the abdomen similar but the middle pair of vittae of the fourth segment are shorter and thicker and the outer pair relatively longer.

Holotype: male, Barro Colorado, August 1938, F. M. Hull, collector: allotype: one female, same data.

NEW DISTRIBUTIONAL RECORDS OF PARATYNDARIS (COLEOPTERA, BUPRESTIDAE).

By William F. Barr, Oakland, Calif.

A number of expeditions into the desert regions of Southern California brought back specimens of four species of *Paratyndaris,* and as this genus has never been recorded from California, it seems worth while to record the places of capture along with the collectors and available host data. I wish to thank Mr. J. N. Knull, Mr. R. H. Beamer, Mr. K. S. Hagen, and Mr. R. G. Dahl for allowing me to publish their records.

Paratyndaris anomalis Knull.

The records of the occurrence of this species in California are as follows: one specimen was collected at El Centro, Imperial County, California, July 24, 1938 (R. H. Beamer), and twelve specimens from Painted Canyon, Riverside County, California, June 21, 1940 (R. G. Dahl and W. F. Barr) on *Prosopis.*

Paratyndaris albofasciata Knull.

Specimens of this species were collected at Adelanto, San Bernardino County, California, July 30, 1940, by D. J. Knull and J. N. Knull.

Paratyndaris barberi (Skinn.).

This species was the commonest *Paratyndaris* collected. The following are the records of its capture: about ten specimens were collected at twenty-three miles south of Vidal, Riverside County, California, June 12, 1940 (K. S. Hagen, R. G. Dahl, and W. F. Barr), on palo verde; two specimens from Thermal, Riverside County, California, June 17, 1940 (K. S. Hagen), on *Prosopis;* fifteen specimens from Painted Canyon, Riverside County, California, June 21, 1940 (R. G. Dahl and W. F. Barr), on *Prosopis;* and about forty specimens from Jacumba, San Diego County, California, June 24, 1940 (K. S. Hagen, R. G. Dahl, and W. F. Barr), on *Prosopis* and *Acacia greggii* Gray.

Paratyndaris olneyae (Skinn.).

This large species is recorded from the following localities: one specimen was collected at Yermo, San Bernardino County, California, June 9, 1940 (W. F. Barr), on *Pluchea sericea* (Nutt.); one specimen from twenty-three miles south of Vidal, Riverside County, California, June 12, 1940 (W. F. Barr), on palo verde; one specimen from Thermal, Riverside County, California, June 17, 1940 (K. S. Hagen), on *Prosopis;* four specimens from Jacumba, San Diego County, California, June 24, 1940 (W. F. Barr), on *Prosopis* and *Acacia greggii* Gray; specimens from Mountain Springs, Imperial County, California, July 26, 1940 (D. J. Knull and J. N. Knull); and specimens from Anze Desert, San Diego County, California, July 28, 1940 (D. J. Knull and J. N. Knull).

NOTES ON THE BIOLOGY OF STAGMOMANTIS CAROLINA (JOH.) (ORTHOPTERA, MANTIDAE).

By Osmond P. Breland, University of Texas.

In a recent study of the parasites of preying mantid egg cases (Breland, 1941), it became necessary for the writer to procure egg cases that had definitely not been attacked by parasites in the field. For this reason, during the fall and winter of 1939–40 and 1940–41, many mantids were collected and kept in the laboratory for the cases that the females deposited. During the time that the insects were kept in the laboratory, they were under almost daily observation. In the course of the study perhaps thirty to thirty-five mantids of both sexes have been kept in the laboratory, frequently with half a dozen or more under observation at the same time. Several writers have studied the biology of *S. carolina* and other species of mantids somewhat in detail (Rau and Rau, 1913; Didlake, 1926; Roberts, 1937a, 1937b), but since most of the preceding work on the adult insects has been in insectaries more or less under out-door conditions, the present observations should be of interest to those who desire to keep the insects in the laboratory.

Methods.

Adult mantids were collected in the field beginning near the middle of October in 1939, and about September 1 in 1940. They were then brought indoors and kept throughout the study under almost total laboratory conditions. The insects did not receive any sunlight after collection, but as will be mentioned, a few minor regulations were made regarding humidity and heat. In the laboratory, the insects were confined in bell jars 8 to 10 inches high and 8 inches in diameter. Several sheets of toweling paper were placed between the bell jar and the table upon which the jar rested. Within the jar a small twig $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter was placed, with one end resting on the table and the other end against the side of the bell jar. This furnished the insects a place to rest, and something upon which they could deposit their eggs. The mantids were fed daily, and a few drops of water were added to the toweling paper. A hole in the top of the jar served for the introduction of food and water. When not in use the hole was plugged with a cork. During the first part of the work before heat was used in the laboratory, no attempt was made to control the inside temperature. When the outside temperature became colder and the building was heated, the temperature was not allowed to go over 80° to 85° F. At night, the heat was turned off and the windows raised slightly so that at times the temperature was as low as 60° F.

COLLECTION AND GENERAL HABITS.

It has been found that in the vicinity of Austin, egg deposition of *S. carolina* starts about September 1 or slightly earlier. After this time, practically no mantids were found by sweeping, but most of the females were collected in localities where their egg cases are usually found: in regions where there is a sparse growth of low bushes or trees. It is suggested that the females seek out a favorable place for egg deposition somewhat before this time, and this may in some cases be some distance from their usual feeding grounds. Some of the females were collected on bushes near houses. It is sometimes necessary to search quite intensively for the insects, since they are difficult to see because of their lack of movements. The males are frequently attracted to lights at night, and most of this sex were collected in this way. The writer has never seen a female attracted to a light which is possibly due to their limited ability to fly.

As is well known, *S. carolina* occurs in both the grey and the green phase, and so far as the writer could determine, no one has as yet determined the factors responsible for this color difference. During 1939, when collections started near the middle of October, only green females were collected. In 1940, grey females were found until about the middle of October, after which only green females were collected. During the time the insects were kept in the laboratory, no indications of a color change were apparent in either the green or grey females.

At least a few females remain active in the field in the region of Austin, Texas, until late November and early December. Several females have been collected during this period, with December 3 the latest collection date.

Females are much easier to keep successfully in the laboratory than are the males. The males do not eat well, and have a tendency to run about the cages trying to escape. The females, however, react excellently to laboratory conditions. They would usually take up a position on the under surface of the twigs with their heads pointed downward, and would sometimes remain in this position practically motionless for hours. Only rarely did the females attempt to escape, and at this time, a living insect introduced into the cage would usually cause them to become normal again. Unless the insects were excessively frightened, the instinct to catch moving insects would apparently overcome the desire to escape.

By the rather simple routine here described, the writer has kept mantids alive in the laboratory under rather extreme artificial conditions for several months. Probably because of the warmer temperature and the constant supply of food, some of these insects were alive much later in the year than they presumably would have been in nature. Reference to Table I should be made for the exact collection and death date for several of the insects upon which accurate records were kept. No actual records were kept on the life of male insects, but these insects usually died before the females.

Food and Feeding Habits.

Although in nature the food of *S. carolina* probably consists of many species of insects, the usual food given to these insects was decidedly limited. During most of the time, the mantids were fed upon the adults and nymphs of the German cockroach, and despite this uniformity of diet, the roaches were relished to the end. In addition other insects that happened to be collected were sometimes used. An average of one to two roaches, and sometimes more was fed to each mantid daily.

The writer found that most of the females were very active in pursuit of their prey, and did not in most instances patiently wait for the insect to come within reach. When living insects were introduced into the bell jar, the females would immediately become alert, watching the insect as it ran about the cage. Unless it quickly came within reach, the mantid would usually go in pursuit until it came within striking distance. Many mantids exhibited the interesting habit of swaying the body from side to side when it caught sight of a moving insect, and quite frequently this movement was continued while the mantid was eating.

Most female mantids ate or attempted to eat practically any living invertebrate that was introduced, although no animals were used that were very large. If the mantid could not break through the outer covering of the animal, it would usually be released after a time, although several attempts at eating it would usually be made. Animals that were eaten included one or more of each of the following: adult crickets, katydids, grasshoppers, squash bugs, a centipede (*Scutigera*), butterflies and moths, caterpillars, American cockroaches, fairly large spiders, and a scorpion an inch and a half long. In addition, one female attempted to catch a carabid beetle an inch in length, but could not successfully grasp the hard body. Another female gnawed for quite some time on the pronotum of a large wheel bug (*Arilus*), but desisted after several unsuccessful attempts.

As has been pointed out by other workers, a mantid is capable of consuming a very large amount of food. A grey female that had previously been receiving the same amount of food as the other specimens was selected at random for a quantity test. This insect was not given any food during the morning. Between 2:30 P.M. and 5 P.M. this female consumed 10 adults of the German cockroach plus one entire egg case and a portion of another attached to two of the female roaches. This insect was quite active in pursuing all roaches up to and including the 10th, but would not pay any attention to the 11th. Sometimes more than one roach was placed in the jar at the same time, and twice the mantid caught a roach in each front leg. It would then eat on one roach for a time, and then as though not wishing to show preference, would switch to the other! This practice has also been observed in other mantids. This insect apparently showed no ill effects from overeating except that next day it was not quite so active in pursuing introduced roaches.

Certain insects were consumed quite rapidly. From eight timed observations from several females it was found that an average of 8½ minutes was required for adult German cockroaches. The time varied from 5½ to 15 minutes. For larger insects, the time required was much longer. One mantid required an hour and 25 minutes to consume a grasshopper just over an inch in length. As a usual thing portions of the wing covers and the harder parts of the legs were not eaten, although occasionally even these least desirable portions were consumed.

During observations relative to the feeding habits of the mantids, the writer received the impression that in a majority of cases, the insect would start consuming its living meal at the anterior end of the body, or would very shortly switch to this region. Thus specific studies were conducted to see if in reality such was the case, and 33 observations were made. In 25 cases the mantids started with the head or very quickly changed to this region; in 3 instances between the thorax and abdomen; once on the thorax itself, and 3 times at the tip of the abdomen. The usual procedure in eating followed this routine: the mantid would seize the insect and immediately start eating. Quite frequently it would start on a projecting portion such as a wing or leg but would then shift quickly to the head or anterior region. It is suggested that the stimulation causing the mantid to start eating at the anterior end is furnished by the struggles of the victim. Since most movements occur at the anterior region to which the appendages are attached, the mantid is probably impelled to attack this portion first.

As mentioned above, one female successfully consumed a good-sized scorpion. In this particular case the mantid happened to seize the scorpion in such a way that the scorpion's tail was helplessly pinioned. Another mantid was not so fortunate. This insect seized another scorpion near the anterior end of the body thus leaving the scorpion's tail free. The scorpion immediately stung the mantid on the head. The mantid released the scorpion at once, and did not attempt to attack the scorpion again, but would retreat to the opposite side of the cage when the scorpion approached. Either mechanical injury or effects of the poison caused the mantid to hold the head in a stiff unnatural position. After a time, the insect crawled up the twig in the bell jar and took up the typical position on its lower surface with the head toward the lower end of the twig. For about three hours, blood slowly exuded from the wound, formed into a drop, and fell to the table below. After this the blood apparently coagulated since the bleeding stopped. The scorpion that was used was presumably quite venomous. Just after it had stung the mantid, two German cockroaches were introduced into the bell jar. The scorpion seized each of these roaches in turn and stung them, which caused the roaches to die within a very few seconds.

The mantid lived in the laboratory for about ten days and after a couple of days seemed normal externally. It would catch insects, but could not eat successfully. The insect would usually make valiant attempts, but despite terrific mauling, sometimes for an hour or so, most of the victims remained more or less intact. It appeared as though the efficiency of the muscles used in chewing and swallowing had been totally impaired. During the ten days the writer did not actually see any food successfully taken, but on occasion partial roaches were seen in the jar indicating that possibly some food was taken. A little over a week after being stung, the mantid deposited an abnormal small egg case. The female died on the 10th day following its unfortunate contact with the scorpion, but whether from the effects of the sting or from natural causes is not known.

EGG CASES AND EGG DEPOSITION.

It has been pointed out previously (Breland, 1941) that in nature by far the majority of egg cases is found on the under surface of twigs. The reason for this is easily seen when one considers that the female mantids rest on the under surface of the twigs with their heads directed downward. All egg depositions that were observed were made on the under side of the twig with the head of the female directed sometimes downward, and sometimes upward. Occasionally an egg case was deposited on the side of the twigs, but the writer did not see the deposition on these occasions.

Rau and Rau (1913) have described in detail the process of egg deposition. The writer's observations agree in general with this description except that in these insects the front tarsi rested on the twig during the oviposition process, and were not held free in the usual resting position as reported by these writers. Most females refused food for a day or so before egg deposition.

The number of egg cases produced by individual females of *S. carolina* or related species has been reported by Rau and Rau (1913), Roberts (1937), and Didlake (1926). The first authors found that the usual females of *S. carolina* produced two egg cases and that a copulation between egg case production was the normal procedure. Roberts found that for *S. limbata* the average egg case production was three cases in 1932, and six cases in 1933. He reports a maximum of seven cases for a single female. Didlake reported that in the laboratory several females of *S. carolina* produced 5 egg masses, some of which were abnormal.

Considering eight females upon which accurate records were kept, and which were kept in the laboratory from time of collection until death from natural causes, these insects averaged over 7 egg cases each. The maximum number produced by a single female was 14. Laboratory conditions presumably accounted for this comparatively large production of egg cases. Table I gives the collection date, the number of eggs produced by each female, the date of death, and the type of female producing the eggs. It is interesting to note that some of the females producing the largest number of cases were collected comparatively late in the season—probably after they had already deposited some egg cases in nature.

Table I.

Collection date	Number of cases produced	Date of death	Type of insect
9. 7.40	8	11.22.40	Grey female
10. 4.40	5	11.23.40	Grey female
10. 7.40	4	11.23.40	Grey female
10.14.40	4	12. 7.40	Green female
11. 8.40	7	1.13.40	Green female
11.15.40	13	3.24.41	Green female
11.18.40	14	4.11.41	Green female
12. 3.40	4	2.25.41	Green female

Some of the insects died a few days after depositing the last case, while a few lived for two or more weeks longer. Considering all the above females, and calculating from the dates the first egg cases were produced to the last egg case deposition, these females averaged just over 10 days between cases. For individual females the longest interval between cases was 25 days while the shortest was 3 days. Some females had greater intervals between the first cases deposited, while in others the intervals were longer between the last cases. Quite frequently the last mass deposited was the smallest of the lot, and was often somewhat abnormal. The majority of the cases deposited was perhaps somewhat smaller than the usual case found in nature, but quite frequently full-sized cases were formed. The grey females were slightly larger than the green females, and consequently the cases produced by them were somewhat the larger.

Since most of the cases deposited in the laboratory were needed in the work with the egg case parasites, complete data are not available as to the number of egg cases that were fertile. Only a few of the first females collected were exposed to male mantids in the laboratory, and these only once before any egg cases were produced. It is probable that most of the females had been fertilized in the field before collection, but as pointed out by Rau and Rau (1913) fertilization is not essential to egg deposition in *S. carolina.* Thus it is possible that some of the females were virgin. Nymphal emergence was observed from the second, third, and seventh egg cases deposited—all from different females. Only a few nymphs emerged, but since these cases were partially parasitized, others may have emerged under normal conditions.

If an egg was left in the jar after deposition, the mantids frequently exhibited the interesting habit of depositing the next egg case in contact with the previous egg mass. This sometimes continued until three or four cases had been deposited in a row, the last mass being deposited in contact with the one that preceded it. In some instances a case was so placed as to partially overlap another. In nature, two cases in contact have occasionally been collected, but never more than two.

In conclusion the writer would like to emphasize again the comparative ease with which these interesting insects may be kept in the laboratory for long periods of time. Teachers who take advantage of this fact will be able to keep living and interesting exhibits in the laboratory with a minimum of effort.

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Important Notice to Authors.—Because of shortage of space, no faunal lists will be published or accepted until further notice. Those on hand will be used only as space is available.

PUBLICATION COMMITTEE.

BIOLOGICAL CONTROL OF THE BROWN-BANDED ROACH.

By R. A. Flock, Tucson, Ariz.

The brown-banded roach is one of the most recent additions to our list of serious household pests in the United States. Although this cosmopolitan tropical roach was reported from Miami, Florida, by Rehn in 1903, it did not become a serious pest until much later. The next indication of its spread over the United States was the report of its presence in Nebraska by Whelan in 1929. Since that time it has been found over a large area (Back, 1938; Rehn, 1938). This roach was first reported from Arizona in 1935 by Hebard from specimens sent to him by Dr. E. D. Ball and Dr. L. P. Wehrle of the University of Arizona. The roach rapidly spread over the larger cities of the state and is a very serious household pest. Because of the difficulty of control it has been extensively studied at the University of Arizona. In 1939 a hymenopterous parasite was found which appears to be very effective in decreasing the numbers of the roach.

This parasite was determined as *Anastatus blattidarum* Ferrière, by Mr. Gahan of the Bureau of Entomology. The specimens were also checked with the types at the British Museum by Dr. Ferrière. This species was described in 1930 from Khartum in the Anglo-Egyptian Sudan, Africa and until now has not been found in any other locality. This parasite is the second Eupelmid which has been found to be parasitic on roach eggs. The other species, also an *Anastatus,* is found in Australia. All of the well known hymenopterous roach parasites belong to the family *Evaniidae.*

At first it was assumed that this parasite was a new species and considerable time was spent in trying to find a native host. The most logical host would be the very rare but closely related *Latiblattela lucifrons* Hebard. The parasite, however, paid no attention to the oötheca of this species. Tests with the common household roaches *Periplaneta americana* and *Blattela germanica* as well as *Blattela vaga* were also negative.

The parasite evidently must have been introduced with the roach either from the eastern part of the United States or from Mexico. The latter route of entry would account for the fact that entomologists of the eastern United States have not found the parasite. However, J. A. G. Rehn of the Philadelphia Academy of Sciences states that the roach was introduced from Africa by way of the West Indies and Florida, and we have every reason to think that the species arrived here by this route.

Superficially the female parasite closely resembles the common red and black household variety of ant, *Solenopis xyloni* McCook, both as to size and appearance. It averages 2.6 mm. long; the head is shining green; the thorax is orange-yellow; and the abdomen is black except for the first and second segments which are whitish. The wings are dark except for a whitish band and a bent white stripe in the middle. The legs are brownish-yellow to yellow. The antennae are black except for the base which is yellow. The wings are held close to the body, which fact together with the light color of the base of the abdomen and wings gives the insect a very antlike appearance.

The male is quite different in appearance from the female. It averages 1.5 mm. long. The body is entirely dark in color and the wings are hyaline. The legs are mostly dark except for the front and middle tibiae, the base of the hind tibiae, and all of the tarsi, all of which are yellowish.

The action of the parasite is very distinctive. It may often be seen running rapidly along walls and other surfaces in roach infested buildings. The antennae are constantly in motion, with the rapidly vibrating tips carefully testing the surface of anything encountered. The insect is rarely seen to use its wings but is very proficient in hopping. When an individual is disturbed, it will hop a distance of from several inches to several feet. The wings are often used in the longer hops but this action is very difficult to observe.

The brown-banded roach is quite characteristic in its egg-laying habits. The egg capsules are concealed in the walls, on furniture, in drapes, and other places. They are often covered with lint and similar material. The roach also is more likely to be found on the walls than on flat surfaces, such as the floor, than are some of the other species. In such places the parasites may also be found usually. The parasite may be found at almost any time of the day or year although it is very inactive in cold weather. Although it has occasionally been seen on the outside of houses, it is ordinarily carried from house to house with the roach egg capsules.

A parasitized egg case is also quite distinctive in appearance. Regardless of where the larvae first develop, the partition walls between the roach eggs are finally eaten away and the outer case is left intact. The larvae and the pupae can be seen lying in all directions inside the case. The larvae are sack-shaped maggots of a dirty yellow color. On the other hand, as the unparasitized roach eggs develop, the embryos can be seen lying in their regular vertical partitions. Also, these embryos can first be seen as green areas along the side of the case. The non-parasitized cases can be separated out at least a week or two before the emergence of the insects.

The opening made by the emerging parasites is also very distinctive. A small round hole is made at one end of the case from which all the parasites emerge. When the roaches emerge, however, the whole crimped edge of the case is softened and the nymphs push out, leaving no visible hole.

There is considerable variation in the number of spotted roach parasites emerging from one egg case. The largest number was 16 and the lowest number was 4. Usually with even as few as four parasites in one case, all of the roach eggs are destroyed. The ratio of females to males was also rather high. In the examples counted there was an average of 9.2 females and 1.5 males per egg case. Almost half of the cases yielded only one male and this is probably the most common number in nature. Rarely, all of the parasites emerging from one case may be females. In this case when the unfertilized females were allowed to ovipost, all of the progeny were males. It may be that a female ordinarily deposits one unfertilized and a number of fertilized eggs in a case. However, several cases which yielded only one male were certainly impregnated at several separate times by different females. The number of emerging adults is apparently determined, at least in part, by the competition between the larvae. For example, one case which was impregnated at least fifteen times yielded only one male and seven females. This was a smaller number than that from some cases which had been impregnated only once. In the most prolific egg cases there was a female-male ratio of fourteen to one and fourteen to two.

There does not seem to be any special means for the female to tell whether an egg case has already been parasitized or not. On one occasion three females were observed ovipositing in one case at the same time. One female will repeatedly oviposit in one case at intervals.

Oviposition is similar to that of many other parasites. The case is selected by feeling with the antennae, and, if satisfactory, the ovipositor is forced into it. The age of the egg case is apparently the chief factor in determining the choice. The contents of the case are further tested with the ovipositor and if satisfactory the oviposition may begin. The length of time required is usually 15 to 45 minutes. The ovipositor may be manipulated around within the case apparently for the purpose of ovipositing in a number of the 16–20 roach eggs which comprise the case. After oviposition the drop of egg contents which forms at the puncture is licked up by the parasite. Normally, the female dies in a very few days but if fed on a mixture of honey and water, it may live as long as two weeks.

The biotic potential of this parasite is very high. In a constant temperature of 82 degrees Fahrenheit the average length of the development was 32.6 days. At the same temperature, Deay and Gould found that an average of 38.4 days was required for the roach eggs to hatch. The high female-male ratio and the number hatching per egg case are also important factors in the increase.

CONCLUSION.

The biological control of the roach by this parasite appears to be very effective. An unequal distribution of this parasite may account for the recent wide extension of the range of the roach. It is hoped that this article and the description of the parasite will enable us to get records of the parasite from the eastern part of the United States. If it should not prove to be found in that area, another explanation of the route of entry into Arizona from Africa will be necessary.

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Wanted.—Brief notes to fill pages.

BOOK NOTES.

The Manuscript—A Guide for Its Preparation. Anonymous. John Wiley & Sons, Inc., New York, N. Y. 1941. ($1.00.)

An ever-present problem with editors is the form in which manuscripts are received, and later the typographical corrections in galley-proofs by authors. We attribute no malevolence to authors, but we emphatically say that here and there they stand in need of acquaintance with the technique of preparing manuscripts, and especially with the art of correctly marking proof, and here is the help (for only $1.00!) that all of us, editors and contributors alike, require so very often. Of course, given time and sufficient experience, all of us pick up a working knowledge of both arts, but now and again we overlook something—which is annoying all around.

Naturally, the highly technical character of entomological journals demands clarity in manuscript and proof corrections—in a penny dreadful, who cares; but *we* must be at all times criticism-proof, in the mechanics at least.

Wiley's little book is the thing to have at hand. It starts with a "Foreword" that tells the long tale of a great printing firm of technical and scientific works of outstanding caliber. The contents follow, then half-tones of the successive headquarters of the firm from 3 Wall Street in the early 1800s to their last offices at 440 Fourth Avenue, where they fill one floor and part of another. The text proper is divided into two parts: I—Preparation of the manuscript and illustrations; and II—Handling the proof. We will not go into detail beyond saying that the first begins with the manuscript and how to prepare it; the illustrations, their proper selection, placing, and kinds; and finally the completion of the manuscript, a far more important detail than authors realize, for it takes up the layout, preface, contents and the preparation of appendices, glossaries and indices. Part II tells in detail how to indicate proof corrections and why, both in the galley proof and in the page proof. To the writer, the most endearing 4 pages of this are those about author's alterations, especially their high cost and general nuisance. Suggestions as to shipping manuscript and proof; and as to formal publication and copyright close the body of the work. There are also an excellent glossary of printer's terms and a very detailed index.

This editor, being what he is, wishes that everyone of the contributors to the journals in his care might have a copy of this book at his elbow to guide him in moments of literary stress. Authors would find it both helpful and soothing—especially when the editor nefariously makes a changeling out of their pet babies.

The book is by far one of the most clear and concise of its kind seen by me. It is a necessary desk companion for every technical author.

J. R. T.-B.

Biology, by H. M. Parshley. Pp. i–ix—1–232. John Wiley & Sons, Inc., New York. 1940. ($2.25.)

As Dr. Parshley says in his preface, this book is a brief survey of the main facts and principles of modern biology. And it must be so, because so vast a subject cannot be briefly discussed in a few pages. Nevertheless, this book presents a comprehensive bird's eye view of a complex subject, and one can thus more readily grasp the main outlines and broad general principles. Reproduction and heredity (including genetics) are developed quite at length in proportion to the size of the book. Behavior, too, is emphasized. The scope of biology, protoplasm and the cell, classification, ecology, nutrition, each is treated necessarily in its main outlines. Each chapter has a brief Bibliography, and in the appendix is a fuller list of works. A short glossary is added, and an index closes the book.

Since Dr. Parshley is an entomologist, many of his illustrations of phenomena are from among the insects, especially a relatively lengthy discussion of the fruit-fly and what its study has revealed in genetics. However, a book of this kind cannot be expected to go at adequate length into any of its subjects, but it is certainly very useful as a picture in bold lines of what modern biology is aiming to do; and of what its adepts believe (advisedly used) they have accomplished and will accomplish. J. R. T.-B.

Triachus vacuus Lec.—Several specimens of this tiny *Chrysomelid* were taken by me on June 16th and August 11th at Montauk, Long Island. Other specimens were collected at Morristown, N. J., on August 18th, all in 1940. This capture confirms Mr. Belkin's record from New York State (Bull. Brook. Ent. Soc., Vol. XXVIII, No. 5, page 222). The identification of these specimens has been verified by Mr. B. E. White of Merced, California.—Borys Malkin, New York City.

EXCHANGES

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OF THE

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BULLETIN

OF THE

BROOKLYN ENTOMOLOGICAL SOCIETY

Vol. XXXVI December, 1941 No. 5

NOTES ON THREE WESTERN GENERA OF FLIES (DIPTERA, TABANIDAE).*

By Cornelius B. Philip, Medical Entomologist, United States Public Health Service.

The known North American species of *Silvius, Apatolestes,* and **Brennania** (n. n.) all occur west of the Mississippi River, and consequently augmentation has been more recent in these than in some of the other better known Nearctic genera. While different species of the first have been found on several continents, those of the other two are not known outside the United States or Northern Mexico.

Types in the following discussion are in the collection of the author except as otherwise indicated.

Silvius Meigen, 1820.

The genus *Silvius,* as restricted by Enderlein (1925) would include without question only *S. gigantulus* Loew of the several Nearctic species now accepted as congeneric. Generic separation of related groups on the basis of the presence or absence of the wing spur is not substantiated by our species since intergradation to complete absence occurs within a single species, and Enderlein admits occasional absence of these spurs in even the type species, *S. vituli* (Fabr.) of Europe. Ferguson (1926) is also of the opinion Enderlein places undue weight on this character in connection with related Australian species. In *pollinosus* Will., *notatus* (Big.) and *sayi* Bren., sharp angulation of R_4 usually occurs, with or without attached short spurs. On the other hand, I have seen but one male in a long series of *quadrivittatus* (Say) with such angulation

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* Contribution from the Rocky Mountain Laboratory (Hamilton, Montana) of the Division of Infectious Diseases of the National Institute of Health.

NOV 18 1941

and none with spurs, which would run this fallaciously to the Chilean genus *Veprius* Rond. as interpreted by Enderlein, a genus long, but nevertheless wrongly, considered as synonymic with *Silvius*.

I have both sexes of *Veprius presbiter* Rond. from Chile through kindness of Mr. A. Fraga Guichard, and consider Enderlein and Kröber as correct in separating *Veprius* from *Silvius,* as the respective genotypes, *V. presbiter* and *S. vituli,* are not congeneric. The head of the former is quite *Tabanus*-like in respect to the short basal antennal segments, wide plate of the flagellum, hairy, swollen subcalli, and in the female, the narrow front with semi-linear callosity (see also Kröber, 1930, fig. 1). The more robust blackish bodies, banded rather than spotted eyes, and non-attenuated though slender palpi also differ from *Silvius*.

The unusual lengths of antennal segments, and non-appendiculate anal cell apically in *S. philipi* Pechuman leave more doubt as to actual generic status of this recently described Nearctic species but examination of other characters and gross appearance leave little question of its affinities with other grayish bodied species of *Silvius* found in Western North America. The relative lengths of the antennal segments are very suggestive of some *Chrysops* species with incrassate antennae, particularly *C. virgulata* Bell., and the species thus forms an intergrade between Enderlein's tribes (1924, p. 305) Chrysopini and Silviini, further lessening the value, questioned by some, of trying to separate *Silvius* and *Chrysops* in higher systematic rank than the genus. Nevertheless, the general *Silvius*-like facies of *philipi* would warrant no more than subgeneric treatment for the present. Because of its interesting taxonomic position the subgenus **Zeuximyia** nov. (Greek, "joining fly") is proposed with *Silvius philipi* Pechuman as monotype species. The subgenus is differentiated from *Silvius* s. str. by the elongated scape and pedicel, the former somewhat incrassate and longer than the flagellum, and a little less than twice the length of the pedicel (see Pechuman, 1938, fig. B). The species would thus still key to *Silvius* in Hine's and Brennan's keys to Nearctic genera. Until more specimens than the holotype are available, the significance of the marginal closure of the anal cell cannot be evaluated.

Ricardo (1900) placed *Mesomyia* Macq. 1859, *Ectenopsis* Macq. 1838 and *Veprius* Rond. 1863 as synonyms of *Silvius* Meig. 1820. The second, as Ferguson (1926) pointed out, is excluded, however, because of the 8-segmented flagellum, but he adds to the synonymy, *Lilea* Walk. 1850 which Enderlein credits with the same character.

Ferguson also states that *Pseudotabanus* Ric. and *Pseudopangonia* Ric. are doubtfully distinct, while Brennan (1935) includes *Perisilvius* End. in the synonymy.

S. notatus (Bigot) 1892. A specimen of *S. laticallus* Bren. compared with the type in the British Museum of Mr. H. Oldroyd shows agreement with this and not as heretofore placed with *S. quadrivittatus* (Say). Transfer of Bigot's species to this genus causes unfortunate priority for the Australian *Silvius notatus* Ricardo (1915), a species validated by Taylor (1919); the name **Silvius abrus** n. n. (Gr., delicate) is here proposed to replace it.

Apatolestes Williston, 1885

As material accumulates of this predominantly southwestern genus, it becomes increasingly obvious that an extensive and thorough revision ultimately will be needed to satisfactorily place problematic specimens that continue to appear. The present notes are still admittedly preliminary, but are intended to provide information that will supplement Brennan's treatment pending availability of sufficient material for adequate conception of specific limits and variation.

The species of *Apatolestes* form a compact and easily recognized group. Originally monotypic with *A. comastes* Williston, 1885, the genus was enlarged by Townsend (1897), who added with question a Lower California species, *A.* (?) *eiseni,* the unique type of which was destroyed in the 1906 San Francisco earthquake. According to later manuscript notes and figures of the original describer of *eiseni* after study of additional material of both sexes from the type area, and of J. M. Aldrich regarding the type which he saw in 1905 (all from the files of the late J. S. Hine), this species cannot be an *Apatolestes,* having only 4 annuli and an enlarged basal "plate" in the antennal flagellum.

In 1925, Enderlein included *Goniops chrysocoma* (Ald.), *Pangonia tranquilla* O. S., *Silvius isabellinus* Wied. [= ? *Stonemyia rasa* (Lw.)], and *Diatomineura dives* Will. [= *S. californica* (Bigot)]. None of these, however, can be considered as belonging here, including the doubtful, but probably eastern *S. isabellinus.*

Considering the not uncommon occurrence of some species in the Southwest, and the interspecific diversity, it is remarkable that it was 1935 before undoubted species additional to *comastes* were noticed. In that year, Brennan added 4 new species and a variety, all from California, and transferred the hairy-eyed *Pangonia hera* O. S. to the subgenus *Comops* (preoccupied) which he erected.

The writer here adds 4 more from the Southwest and calls attention to the probable occurrence of still other forms that are likely to be recognized with augmentation of materials. While there is pronounced homogeneity in generic limits, the variation displayed among even limited series, particularly in size, indicates either wide specific latitude in certain instances, or the presence of still unrecognized forms which cannot be defined in the absence of many more specimens of both sexes. Confidence in determination of males in particular, will require plenty of females for associational studies, as the frontal characters of the latter are the most satisfactory for specific differentiation at present. All species have females with fronts that are strongly convergent above, grooved palpi, and in both sexes short, robust proboscides with large labella, the subepaulets bare, the tegulae with a few white hairs.

A. comastes Will. In a considerable series of specimens in various collections from California and Arizona, intergradation in a wide variation of tinctorial characters and in size suggests (1) that this may be composite beyond the limits of subsp. *willistoni* Bren., and (2) that the latter is not as sharply defined as originally indicated. Typically, as given by Brennan, the size is between 8 and 11 mm. A form otherwise indistinguishable, however, has been seen in both sexes of 12 to 14 mm. in length, including a female taken from an auto radiator by Dr. W. L. Jellison in Hamilton, Montana, in apparent fresh condition; as the car concerned had not been out of the State, this and a pair from Spokane, Washington, extend the distribution considerably northward. In some of these larger forms the femora are more brown than black and the clouds on the cross-veins more accentuated, but some variation in these respects is also seen in the smaller form. The antennal flagellum is usually entirely black, as indicated in the original description (unless the flagellums of the types have faded, Brennan's characterization as "yellowish brown . . . except the black apex . . ." is not understood) and the darkening of the integument or vestiture of the palpi of the fore coxae and of the costal cell is extremely variable. In some, the bodies are predominantly grayish, in others blackish. No structural characters to support separation have been found. The point of separation of *willistoni* is therefore difficult to ascertain while Brennan's typical form with entirely white haired palpi and completely hyaline costal cell is seldom seen.

The male of neither form has ever been described. Because of black flagellums, darkened costal cells, and palpi with a few black hairs on either segment of the latter among abundant whitish hair, a series of both sexes from Garces, Arizona (no date), in the Museum of Comparative Zoology, relate to subspecies *willistoni* Bren., and a male is here described as allotype, provided through courtesy of Mr. Nathan Banks. It is entirely possible that no males will be found within the species more pallid than this for association with the typical form, although a male from Baker, Oregon, has brownish femora, a female taken at the same time having typically blackish femora.

> Length, 10 mm. Eyes ostensibly bare, upper area of enlarged facets well differentiated, brown, about ⅔ of total eye area; the 3 ocelli on a prominent, dark tubercle covered with black hairs at vertex; frontal triangle gray pollinose. First 2 antennal segments gray, covered with mostly pale hairs, third black, a suggestion of brown at the extreme base. Palpi brown, covered with abundant pale and a very few black hairs, the first segment subshiny, swollen, the second rather elongate, a little shorter than the stylets in length, rather blunt at the apex, but not as truncated as in *parkeri*. Lines on dorsum of thorax not as plain as in the females, the pile longer and brownish but pale around the thoracic margins, including the blackish scutellum. Femora blackish, the tibiae and tarsi brown. Costal cell of wings faintly tinted; clouds imperceptible. Abdomen as in the females but more hairy, the pale incisures more pronounced.

A. ater. In 2 smaller females which apparently belong here, there are a few whitish hairs on some of the abdominal incisures.

A. hinei Brennan. A female from Monterey, California, agrees well with most characters of a paratype obtained through courtesy of Dr. R. H. Beamer, but the pile of the face, chest, fore-coxae, hind femora and abdominal venter is predominantly pale. The third antennal segment of this specimen is entirely black to the base. A male from Riverside County also has a totally black third antennal segment and the enlarged eye facets occupy not more than ⅔ the total eye area.

A pair from Dulzura and Monterey also agree, but are so small (10 mm.) they appear casually to be a different species.

A. affinis n. sp. Some affinities with the above mentioned, Monterey *hinei* female in having an admixture of pale and blackish hairs on the face, thorax, femora, fore-coxae and venter. General color light brownish, including a somewhat elliptical, bare frontal area, the wings subhyaline with faint clouds about the short spur and fork, and outer cross-veins.

Holotype ♀, 10.5 mm. Eyes ostensibly bare, unbanded, with iridescent greenish hues even in the dried state. Front convergent above, basal width to height as 3:5, buff pollinose around a sharply outlined, broad, brown, finely wrinkled bare area shaped like an upward-directed spearhead, with the point truncated by the anterior ocellus, 2 marginal notches on each side not quite touching the eye margins about a quarter distant from the base, and grading into an acute point at the top of the subcallus; latter buff pollinose. Cheeks also buff pollinose along eye margins, face gray pollinose, both covered with fine white and black pile grading to entirely white behind. First 2 antennal segments yellowish with black hairs above, pallid below, the flagellum entirely contrasting black. Palpi yellowish, short, about $\frac{2}{3}$ the length of the proboscis, the second segments very swollen basally, short, the length a little less than twice the basal thickness, with deep antero-basal sulci, and covered with short black hair; basal segment with blackish hair grading into whitish proximally. Tongue dark, labella large.

Thorax brown with rather narrow gray stripes and short appressed yellow and black hairs on the dorsum, pale around the margins including the scutellum. Pleura, chest and fore-coxae grayish-buff pollinose with intermixed white and black hair. Legs yellowish, concolorous, with mixed black and white hairs, predominantly dark on the tibiae and white on the 2 hind pairs of femora.

Abdomen light brown with narrow, pallid incisures, hair of first segment, venter, and dorsal incisures predominantly pale yellowish, otherwise the second and following tergites with short black hairs; some sparse black hairs also caudad of the second sternite.

Loreto, Baja Calif., May 20, 1921. In the California Academy of Sciences, No. 4807. A less well preserved paratype ♀ of same data in the collection of the author.

The combination of short, thick palpi, peculiar shaped, bare area of the front, brownish body and subhyaline wings are distinctive. The mixed black and pale hairs of the face, thorax and fore-coxae make it impossible to run in Brennan's (1935) key.

Apatolestes sp. "A." A female labelled "Geo. H. Field, San

Diego, Calif." without date, resembles *affinis,* but even in a teneral condition appears too dark. The abdomen and appendages are shrunken. A large spearhead-like median callus on the front, and the thorax and scutellum appear blackish; the femora are too teneral to be sure of their basic color. Shadows on the outer cross-veins and fork of the teneral wings suggest clouds, but definite tinting, as in *affinis,* cannot be decided in the absence of better specimens.

Apatolestes aitkeni n. sp. Small blackish bodied flies, with golden yellow hairs on the abdominal incisures, and lightly fumose wings, the costal cells brown. Eyes ostensibly bare (minute scattered hairs visible in certain lights).

Holotype ♀, 11 mm. Front with basal width to height as 2 : 3; predominantly shining black below the ocelli, and swollen above the subcallus, beset with yellow hairs above the swelling; yellow and brown pollinose either side the ocelligerous tubercle, the latter sparsely pollinose; the pale yellow pollinosity of the subcallus encroaching half way across the swelling above as a broad, median, truncated, subquadrangular extension about one-third the width of the callosity, and on either side as attenuated prolongations along the eye margin, the margin in between these extensions markedly rounded in consequence. Face, cheeks, and occiput pale grayish yellow pollinose and pilose, with some black hairs intermixed on the cheeks; latter not markedly swollen. First two segments of antennae gray pollinose with yellow and black hairs, not produced above, the first about equal in length and thickness, the second half as long, the flagellum black, attenuated, with 8 annuli. Palpi about ⅔ the length of the black tongue, deep yellowish to blackish beneath the first segment, with black and some pale hairs on both segments, the second basally swollen, and the usual dorsal groove. Thorax blackish, sparsely dusted with gray pollen, the usual dorsal gray lines rather faint, covered with appressed golden yellow hairs and scattering erect black ones; pleural hairs pallid with some black. Scutellum and its marginal hairs black intermixed with a few pale yellow ones on the disc. Spurs on R_4 short, the fumosity a little more intense on the cross-veins. Halteres and legs deep brown, the femora and forelegs apically almost blackish; coxae, mid and hind femora with long yellow hairs, a few black ones on the fore coxae. Abdomen black with black hairs basally on each segment, the incisures above and below with prominent bands of golden yellow hairs, widest on the basal 4 segments, narrow on the last 3.

Allotype ♂, 10 mm. Darker than the ♀, and more subshiny. Head with enlarged facets occupying almost $\frac{3}{4}$ the total eye area. Ocelligerous tubercle black, prominent, with black hairs behind. Hairs of occiput and upper face pallid grading to blackish below, those on the basal antennal segments and palpi, deep black. First palpal segment very swollen, shining black, the apical one dull black, short, and diagonally truncated at the tip. Thorax and vestiture entirely black except for a few fine pale hairs on the anterior dorsum, the lines hardly discernible. Wings as in the female. Legs black except the anterior tibiae basally and the mid and hind tibiae and tarsi, brown; vestiture black except for a few yellow hairs dorsally on the 2 hind pairs of femora. Abdomen with golden hairs less extensive on the incisures, none at all except laterally on the first segment, very narrow on the remainder dorsally, more prominent ventrally, the incisures also with a narrow underlying gray pollinosity.

Both specimens taken in Baboquivari Mts., Ariz., May 8, 1938, by F. H. Parker; in the collection of The California Academy of Sciences (Nos. 5148–9) through courtesy of Dr. T. H. G. Aitken, for whom they are named.

In appearance the species looks much like a very dark variety of *comastes* with golden haired abdominal bands and tinted wings.

Apatolestes colei n. sp. A species as large as any known in the genus, almost uniformly pure gray in gross appearance, except for distinct darker lines on the dorsum of the thorax, and frosty yellowish shades on the sides of the abdomen (broader in the male), venter, and appendages. Third antennal segments and eyes contrasting black, the latter ostensibly bare, without stripes, but with iridescent green and purple hues even in the dried state.

Holotype ♀, 13 mm. Head wider than the thorax, front broadest of the genus, ratio of height above subcallus to basal width as 6:7; buff pollinose and strongly convergent above; a yellowish, vertical, denuded dash mesally one-fifth the width and half the height of the front, pointed below and resting on the subcallus; the three ocelli on a raised, darkened tubercle. Subcallus much narrower than the front at the base, *i.e.,* widely separated from the inner angles of the eyes. Cheeks unusually swollen, creamy, the face below the antennae depressed, gray.

Antennae with first 2 joints pale yellowish, white hirsute, the third contrasting black; the first bluntly swollen dorsally, taller than the second. Apical palpal segment very swollen basally, and short, length less than twice the basal thickness, almost reaching the tip of the proboscis. Vestiture of entire palpi white except for a few, coarse black hairs anteriorly, somewhat obscuring the reduced basal furrow.

Thorax with appressed, pale yellow hairs on the dorsum; a very few inconspicuous, black hairs on the pleura, otherwise white including the coxae and femora; the tibiae with coarse, sparsely scattered, black hairs intermixed with white. Scutellum dark gray pollinose and pilose, some black hairs intermixed on the disc. Legs and wing veins concolorous yellowish, vein R_4 with a long spur basally, no evident cloud at the fork. Halteres with pale stems, cinereous knobs. The indefinite yellowish, lateral shades on all tergites but the first, encroach inwardly along each incisure; the entire venter of the same yellowish shade. Abdominal vestiture pallid, no black hairs present.

Allotype male, 14 mm. Essentially like the holotype except for sexual differences. More hairy, especially on the palpi and thoracic dorsum, the dark lines of the latter more evident; indistinct, sparse black hairs scattered over the thorax and abdomen dorsally, except the incisures, and a few on the pleura and posterior tergites. Palpi not truncated apically, nearly as long as the proboscis, decurved apically. Upper eye facets but little enlarged.

Both from La Quinta, San Bernardino Co., Calif., July 15, 1920, F. R. Cole, through courtesy of the collector, a capable and productive student of the Diptera, for whom the species is cordially named.

In appearance, this is nearest *parkeri* and *similis*. The lack of clouds on the cross-veins, unusually swollen cheeks, wide front with peculiarly isolated subcallus (♀), and elongate palpi (♂) distinguish *colei* from both, and in addition, the dark scutellums from the former and pale yellow legs and lack of abdominal pattern from the latter. The allotype was compared with the types of *Tabanus villosulus* Bigot by Mr. H. Oldroyd, and the holotype with that of *similis* Bren. by Dr. Alan Stone, and declared not in agreement in each case.

A. parkeri n. sp. A pallid, grayish brown species with striped thorax and banded abdomen, yellow scutellum, legs and venter, and isolated clouds on the outer cross-veins. Palpi of male unusually truncated, and front of female pollinose or irregularly denuded due to wear. Eyes ostensibly bare.

Holotype ♀, 13 mm. Front yellowish pollinose (irregularly worn mesally), little swollen, convergent above, basal width to height as 1 : 2; ocelli prominent on a brown, yellowish-pollinose tubercle at vertex. Subcallus, face and cheeks yellowish pollinose, paler below. Vestiture pale creamy on occiput, face, first 2 antennal segments and palpi, some black hairs intermixed on cheeks. Scape and pedicel yellow, not dorsally produced, flagellum black, attenuated, annuli distinct. Palpi yellowish, 2 or 3 black hairs and a deep dorsobasal furrow on the "knee" of the second segment; this segment almost 3 times longer than thick, and not quite reaching the tip of the short, dark brown tongue; the labella very large, longer than the palpi.

Thorax with 5 gray and 4 brown, very evident stripes, covered with yellowish appressed and a few black hairs, pallid around the margins including the scutellum; latter yellowish, invested like the thorax. Pleura, chest, coxae, femora and tibiae pale yellowish pilose and pollinose. Legs concolorous yellowish, with some darker shades on the femora, a few black hairs apically on the fore and hind tibiae; tarsi brown. Wings hyaline, some vein margins, particularly the outer cross-veins, faintly clouded; base of R_4 appendiculate and with a distinct cloud.

Abdomen hoary, pale brown above, the venter including vestiture yellowish; entire first tergite and the incisures of the others broadly pale yellowish pilose, widening laterally to cross the tergites, and mesally to form a row of easily rubbed triangles, whose apices do not quite cross the respective tergites.

Ehrenberg, Arizona, July 31, 1938, F. H. Parker.

Allotype ♂, 12 mm. Area of enlarged facets not as marked as in some species, occupying about $\frac{1}{2}$ the total eye area; ocelli on a prominent, brown tubercle, covered posteriorly with yellow hairs. Scapes with slight, robust dorsal teeth, and a few coarse black hairs inwardly on the second segments. First palpal segments more swollen than the second which are a little less than twice longer than thick, very short and diagonally truncated apically a few scattering black hairs on each segment, a little shorter in relation to the tongue, than in the

♀. Remainder essentially as in the ♀, the vestiture a little longer, with more black hairs on the tibiae, and thoracic dorsum, and the brown lines of the latter darker.

Same locality and collector as holotype, June 21, 1938.

Paratypes.—2♂, 8♀, same locality and collector, June, 1940; ♂, Blythe, Calif., July 16, 1938, Timberlake, "at light." Many of the Ehrenberg specimens were taken by Mr. Parker at light also. In the collections of the British Museum (N. H.), U. S. National Museum, University of Kansas, California Academy of Sciences, Dr. T. H. G. Aitken, Mr. F. H. Parker, and the author.

Separated from *similis* Bren. by the more yellowish integument including scutellum, predominantly pale pleural hair, more pronounced wing clouds, and in the female the pollinose or irregularly worn fronts, without the mesal "spearhead-like" bare area.

A. similis Bren. A female from Antioch, Calif., July 6th, agrees in size and characters, although rubbed dorsally, but the type locality (Los Angeles) is much farther south. The integument, including the scutellum and streaks on the femora, is dark cinereous; the frontal index is about as 1 : 2, the "denuded midstreak" brown with yellowish shades below, pointed above and below, widened mesally like a spearhead, but not notched nor limited by the divergent sutures below the ocelli as in *affinis* or sp. "A," *i.e.,* rather widely separated from the eye margins by gray pollinosity, which also differentiates it from *parkeri.* Black hairs are prominent on the prescutal lobes and pleura which are mostly pale in *parkeri.* The wings are neither tinted as in *affinis* nor with clouds on the crossveins as in *parkeri,* though suggested. *A. villosulus* (Bigot) may be the male of this.

Apatolestes sp. "B." A male collected on the beach at Davenport, Calif., June 14, 1940, by Dr. M. T. James, appears to belong to an undescribed species, but it seems best to delay naming until the female can also be taken.

This male is 14 mm. in length, the entire body unusually hirsute, white below, blackish above except the margins of the thorax including scutellum and the narrow abdominal incisures. The dorsal integument is subshiny black, the usual thoracic gray lines very narrow. The palpi are elongate and rather pointed as in *colei,* first 2 antennal segments gray with long whitish hairs, the flagellum black. The legs are predominantly yellowish, appearing darker distally due to abrupt cessation of the white hairs at about the distal fifth of the tibiae; the hind tibiae are unusually adorned with long white hairs, particularly underneath, subequal to those on the femora.

Tabanus villosulus Bigot. This is an *Apatolestes.* Study of the types (2♂, California) in the British Museum inclined Hine (unpublished notes) to the opinion this was the male of *hera,* but the eyes are bare according to Oldroyd, who indicated them to be closer (though doubtfully identical) to *parkeri* with faint clouds on the wing cross-veins, than to *colei,* with males of both of which he compared Bigot's types. However, *villosulus* differs from *parkeri* in the black scutellum and less truncate palpi, and from *colei* in the isolated wing clouds and shorter palpi. The description sounds very like that of *similis* Bren., but its actual identity will have to await more adequate comparative study.

Brennania, nom. nov.

Stone (correspondence) called attention to the preoccupation of *Comops* Brennan (1935) by Aldrich (1934) since the writer raised this name to generic standing (1941). The name *Brennania* is therefore proposed to replace Brennan's *Comops,* with *hera* (O. S.) still monotype species.

Although minute, scattering hairs can be seen on the eyes of most any well preserved *Apatolestes,* the abundantly hairy eyes in both sexes of *Brennania hera* warrants generic rather than subgeneric recognition, as accorded certain tabanine groups, in spite of the close structural similarity of such characters as the fronts of the females.

The typical form has predominantly pale yellowish vestiture. There is also a dark form in which the hairs of the body and appendages are chocolate brown, yellowish only on the inner face, eyes, humeri, pleura (in part) and margins of the scutellum. Although I have not seen intergrades, this form hardly warrants subspecific treatment as it readily keys with the typical form.

The following key is offered as a tentative aid pending accumulation of additional materials to allow adequate treatment by a future reviewer. The section on males in particular, should be used with caution because of their still confusing homogeneity at this time. The types of *villosulus* (Bigot) have not been seen, and their exact status will require further clarification.

PROVISIONAL KEY TO APATOLESTES WILLISTON.

1. Eyes densely hairy .... [*Brennania hera* (O. S.)]

Eyes bare, or minutely hairy 2

2. Males 13

Females 3

3. Front basally inflated, shining black or dark brown, pollinose only at the vertex around the ocelli 4

Front either normally pollinose, or with a bare restricted area, not with a callus-like swelling above the subcallus ... 7

4. The callosity deeply emarginate across the base; body chiefly dull black with golden yellow pile on the thorax, coxae and hind femora, and abdominal incisures . **aitkeni** n. sp.

The callosity with lower margin sometimes sinuate but not deeply notched by rectangular invasion of pollen from the subcallus 5

5. Body entirely subshining black, the wings smoky . . *ater* Bren.

Body grayish to dull blackish, only the costal cells sometimes tinted 6

6. Costal cell hyaline; palpi pale haired .... *comastes* Will.

Costal cell tinted, palpi usually with some black hairs. subsp. *willistoni* Bren.

7. Scutellum yellowish 8

Scutellum blackish or cinereous 9

8. Front entirely pollinose when not irregularly worn; flagellum black .... **parkeri** n. sp.

Front with an expansive bare area; flagellum mostly yellow. *albipilosus* Bren.

9. Front very wide, height and basal width subequal, a narrow mesal, bare brown streak about $\frac{2}{3}$ its height; cheeks unusually swollen .... **colei** n. sp.

Front narrower, about 1 : 2 or 2 : 5, the bare area more expansive 10

10. Body predominantly gray; wings subhyaline; midfrontal bare area widely separated from eye margins (*villosulus*?). *similis* Bren.

Body predominantly brownish or darker; wings fumose; bare area almost touching eye margins 11

11. Front with large, spearhead-like, sharply defined bare area, pointed above and below 12

Front with a dull, more expansive bare area . . . *hinei* Bren.

12. Midfrontal callosity, legs and 4 thoracic lines brown. **affinis** n. sp.

Midfrontal callosity, 4 thoracic lines and (?) femora blackish (teneral San Diego specimen) .... sp. "A"

13.* Wings hyaline, with or without infuscated costal cells or isolated clouds; at least pleural hairs largely whitish . . . 14
Wings smoky, or palpal and pleural hairs black 20
14. Costal cell fumose, distinctly darker than remainder of wing. 15
Costal cell completely hyaline 16
15. Size not over 11 mm.; femora usually dark. *comastes* subsp. *willistoni* Bren.
Size over 11 mm.; legs often concolorous brownish. *comastes* form?
16. Palpi truncated apically, short and stubby (hairs sparse) . 17
Palpi elongated, more slender (sometimes obscured by long, dense pile) 18
17. Scutellum and venter yellow; wings with pronounced clouds on the outer cross-veins and fork . . . . **parkeri** n. sp.
Scutellum and venter cinereous; wings with these clouds faint (except in a possible dark form?) . . . . *similis* Bren.
18. Size 14 mm. or over; palpal and facial vestiture dense. . . . 19
Size under 14 mm.; these hairs not especially dense. *comastes* Will.
19. Tibial vestiture normal; cheeks unusually swollen; dorsum hoary, venter yellow . . . . **colei** n. sp.
Hind tibiae "feathered" underneath with long white hairs like the femora; cheeks normal, dorsum subshining black, venter pale gray . . . . sp. "B"
20. Abdominal incisures, especially ventrally with golden yellow pile; small species (10 mm.) . . . . **aitkeni** n. sp.
Abdomen entirely black or with yellow but not golden hairs; larger species 21
21. Shining black species . . . . *ater* Bren.
Dull black species with pale abdominal incisures . . *hinei* Bren.

Note: Transfer of a portion of this paper from a previous manuscript delayed appearance of the description of the subgenus *Zeuximyia* and resulted in its prior use in a key and in association with a specific name (Canad. Ent., 73: 4 and 9, 1941). However, in accord with Article 25 of the Rules applying to names proposed subsequent to 1930, the name dates properly from this article, having no nomenclatorial standing until its genotype was specifically stated. Discovery of additional specimens of both sexes of *Stone-*

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* The theoretical ♂ of *albipilosus* should separate out immediately on predominantly yellow flagellum, that of typical *comastes* at 19 on hyaline costal cell, lack of black hairs on palpi and coxae, and possibly brown basal flagellar segments.

myia velutina (Bigot) 1892 [*Corizoneura*], heretofore known only from the unique type in the British Museum, has clarified this doubtful species, though it causes unfortunate synonymy of the recently described *Stonemyia albomacula* Stone, 1940.

SUMMARY.

The generic limits of Nearctic *Silvius* and differentiation from *Veprius* are discussed, and *Zeuximyia* n. subgen. is described for *S. philipi* Pech., monotype. *S. laticallus* Bren. is synonymized with *S. notatus* (Bigot), and *Stonemyia albomacula* Stone with *St. velutina* (Bigot). *S. abrus,* new name, is proposed for the preoccupied *S. notatus* Ric. (not Bigot) of Australia.

Four new species are added to the genus *Apatolestes,* viz., *affinis* (♀) from Lower California, *colei* (♂, ♀) from California, and *aitkeni* (♂, ♀) and *parkeri* (♂, ♀) from Arizona. Comments on variation in other species, particularly the genotype *comastes* Will., generic relation of *Tabanus villosulus* Bigot, and a provisional key to species are included. *Brennania* n. n. is proposed for *Comops* Brennan (not Aldrich) with *hera* (O. S.) as monotype species.

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A NEW ANT PARASITE (HYMENOPTERA, BRACONIDAE).

By C. F. W. Muesebeck, Bureau of Entomology and Plant Quarantine, United States Department of Agriculture.

Only fragmentary information is available concerning the habits of species belonging to the rather anomalous braconid genus *Elasmosoma* Ruthe, but the few recorded observations suggest that all species are internal parasites of ants. Specimens are rare in most collections. Before the receipt of the long series upon which the following description is based the National Collection contained less than thirty specimens belonging to *Elasmosoma,* these being distributed among five species.

Elasmosoma petulans, n. sp.

Runs to *vigilans* Cockerell in my key[1] and is very similar to that species. It may at once be distinguished, however, by the shorter inner calcarium of the hind tibia. This is definitely shorter than the metatarsus in *petulans,* whereas in *vigilans* it is clearly a little longer. Furthermore, the abdomen is somewhat longer and stouter in the new species than in *vigilans,* the dorsal impression of the hind coxa is much more sharply margined, and the clypeus is entirely black rather than mostly yellow.

> *Female.*—Length about 2.5 mm. Head barely as wide as thorax; temples receding directly from the eyes, weakly convex; eyes enormous, strongly convergent below and nearly touching the mandibles; face narrower at clypeal foveae than long, finely transversely rugulose; clypeus more finely rugulose than face; frons coarsely granular; vertex and occiput transversely aciculate; ocellocular line less than twice as long as diameter of an ocellus; antenna not quite so long as thorax.
>
> Mesoscutum and scutellum finely granular and thickly covered with appressed pubescence; propodeum completely rugose; mesopleuron and metapleuron finely granular and dull; angulation of basal vein a little above the middle; dorsal impression of hind coxa unusually deep and completely carinately margined; longer calcarium of hind tibia about three-fourths as long as metatarsus.
>
> Abdomen as long as head and thorax combined; first tergite

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[1] Proc. U. S. Natl. Mus. 61, Art. 15: 5, 1922.

as broad at apex as long; second and third tergites much broader than long, the second slightly longer than third; basal three tergites strongly coriaceous and dull, the others faintly sculptured and shining; hypopygium not nearly attaining apex of abdomen, compressed, weakly incised on apical margin, not angulate laterally.

Black; scape, pedicel, labrum, mandibles except teeth, palpi, and all legs entirely yellow; tegulae blackish; wings hyaline, costa and stigma brown; venter of abdomen piceous.

Type locality.—Jackson, Ohio.

Type.—United States National Museum No. 55665.

Described from fifty-one female specimens taken by L. G. Wesson, July 15, 1938, as they were hovering over a raiding column of *Formica sanguinea rubicunda* Emery. Some of the paratypes in Wesson's collection.

GEOCORIS ATRICOLOR FEEDING.

By G. F. Knowlton and G. S. Stains, Utah Agricultural Experiment Station, Logan.

A black big-eyed bug, *Geocoris atricolor* Montd., found among aphids in an infested pea field near Logan, was brought into the insectary where it was caged in a 4-dram shell vial with several pea aphids (*Macrosiphum pisi* Kalt.) of different ages. Activity of the specimen was observed under a wide-field microscope. Approximately 7 minutes after being placed in the vial, a second instar pea aphid nymph was quickly grasped by the *atricolor,* which used its front tibiae and tarsi to hold its small prey while it pierced the aphid with its feeding stylets at a point along the suture between the third and fourth segments of the abdomen. After such feeding insertion, the aphid was released by the predator's legs but was securely held, extended at the tip of the predator's rostrum. Feeding occurred in this manner for twenty-two minutes; the shriveled aphid body was discarded, most of the fluids having been removed.

Following a five-minute rest, a third instar pea aphid was seized in the same manner as the first. The labium of the predator was pushed against the abdomen of the prey, and soon the stylets were observed to have entered the aphid body and to be exploring the various areas within reach, even extending into the legs. The length of the stylets observed within the aphid body varied greatly, such length being governed by extending and retracting the labium with hinge-like movements of the segments. There was some indication that digestive fluids were injected to accomplish partial predigestion. A short time after penetration of the feeding bristles, areas reached by the stylets became paler in color, suggesting that some chemical change may have occurred; during this time the aphid's abdomen had not shriveled as usually occurs when predators suck out the body fluids from aphids and nymphal psyllids. While the stylets of the predator were extended into a femur of the aphid, air bubbles appeared, these being ejected from the end of the slender feeding structures. The leg gradually was filled with bubbles. Liquid also may have been ejected. Pigment of one eye of the aphid began to disintegrate, suggesting that the predator stylets had pierced it, or that digestive juices had caused it to break down. Coagulation of the pigment seemed to occur, rounded dark particles being drawn out to become more elongate as feeding upon them occurred. The dark particles were seen to be taken in at the end of the feeding structures. During the 18 minutes of feeding on this specimen, body shrinkage was not apparent until more than 13 minutes of feeding had elapsed.

Occurrence of Orbellia hiemalis Loew in Maine (Diptera).—This European species, originally described under the generic name of *Crymobia* Loew (1859), is remarkable in that it seems to occur only during the colder months of the year from late fall to early spring. I collected a single female specimen in November at Orono, Maine, many years ago. Dr. D. G. Hall states (in lit.) that there is a specimen from Custer County, Colorado, in the U. S. National Museum. Aldrich (1926) in his key included the genus with those lacking a humeral bristle. This is a mistake, the known species of the genus have such a bristle. The same error occurs in Curran's key (1934). The generic names *Anorostomoides* Malloch (1916) and *Barbastoma* Garrett (1921, 1922, 1924) as well as *Crymobia* Loew (1859) are apparently all synonyms of *Orbellia* R. D.—O. A. JOHANNSEN, Ithaca, N. Y.

COLLECTING HELIOTHINAE IN 1940.

By Alex K. Wyatt, Chicago, Illinois.

There is a certain hilltop northeast of Elgin, Illinois, entirely surrounded by cultivated fields, that is a veritable mine of interesting flora and fauna. This is where Maurice Bristol of Elgin, captured the first *Schinia gloriosa* and *Dasyspoudea lucens,* both, species that have heretofore been reported only from Western and Southern points. Later, the food plants of these pretty moths were discovered and the moths successfully reared to maturity. *Schinia gloriosa* is found on *Liatris,* principally *Liatris cylindracea* and *scariosa.* Having learned the food plant, both moth and larva have since been found on the prairies northwest of Chicago and at Waukegan. They are doubtless present also in the Indiana dune region and other points in that direction where *Liatris scariosa* or *cylindracea* is plentiful. *Dasyspoudea lucens* feeds on lead plant (*Amorpha canescens*) and has since been found at Waukegan where that plant is well represented.

This year (1940) on August 3, while looking for moths of *Schinia gloriosa* on that same hilltop at Elgin, three specimens of what was first assumed to be *Schinia imperspicua* were captured. Upon later investigation they proved to be *Schinia gracilenta,* another Texan species. These three specimens were quite fresh, and having risen from the shrubbery almost at my feet, I noted the plant, which was the same in each instance. Later, on August 24 when collecting on the hilltop again, the plant was in bloom and we succeeded in securing larvae which were then quite small. Additional moths, resting on the bloom, were also taken. The food plant is *Kuhnia eupatorioides.* Still later in the year, larger larvae were secured and with them larvae of yet another *Schinia,* slightly smaller. Relatively few pupae were obtained, and it remains to be seen whether any are of the second species. Judging from the size of the larva and its numerical preponderance, we are confident that the first larva found, an unusually interesting one, is that of *gracilenta.* A superficial description of this larva follows:

> Head.—Yellow with two large black patches at apex and two smaller spots on side.
>
> Body.—Densely covered with short hair giving it a velvety appearance. There is a whitish dorsal stripe followed by a bright orange yellow, shading laterally into another white area. The dorsal light band is broken by a series of olive gray spots that become longer and narrower toward the anal end and

form an irregular broken line. A shading of the same color borders the yellow band laterally, merging into the white. The entire body is covered with a number of shiny black spots or tubercles, these being distributed approximately as follows: The first thoracic segment has twelve, of which two dorsal spots are large and irregular about twice as long as wide, with a smaller round spot preceding each. The second segment has spots on the side, none dorsally. The third segment has a row of five on each side and another spot behind the row. Each abdominal segment has from 16 to 20 black tubercles, the first two having these tubercles ventrally also.

The mature larva is from 1 inch to 1.1 inch long. When disturbed it curls up and drops to the ground. It rolls easily on a smooth surface.

The second larva attains a length of about .75 inches. Head yellowish, two brown marks poorly defined, at apex. Body smooth, not hairy. General color gray brown, a slender dorsal line slightly paler than general color and disappearing posteriorly. Each segment has a diamond-shaped darker area dorsally with the pale line through center. These darker areas are outlined by irregular pale spots when seen through a strong lens. The general appearance is of a dark shade dorsally. Stigmata are black on an area slightly paler than the general color. As a whole the larva appears a dull gray brown with no pronounced markings, except a dark band dorsally and a slightly paler band laterally. Underside pale yellowish brown.

Mr. Leslie Banks captured a specimen of *Schinia tertia* at an electric light about two miles south of our hilltop, so there is a bare possibility that the second *Schinia* may prove to be that species.

Larvae of *Schinia trifascia* were found on *Eupatorium purpureum* at River Grove on September 8. These larvae were mostly of good size and pupated by September 22, much earlier than larvae found on *Eup. sessilifolium.* *Schinia brevis* was missed as a moth, but larvae were beaten from New England aster just south of Desplaines on October 13. Some were quite large, others less than half grown. Due to the fine Indian Summer weather, it was easy to bring these to maturity. No description of the larva was made. They feed in the customary way of *Schinias,* burying their heads in the pappus of the mature brown flower heads to reach the developing seed beneath.

With the larvae of *brevis,* a few larvae of *Heliothis phloxiphaga* and several of a brightly marked *Cucullia* were found, some of these fully mature.

Earlier in the year several specimens of *Heliolonche indiana* developed from pupae of larvae taken in 1938. These emerged May 26 to June 1, exactly on schedule with the customary time of flight. The same proved true of other 1938 pupae.

Dasyspondea lucens, 1 specimen, June 20.
Rhodoecia aurantiago, 2 specimens, July 9 and 11.
Schinia trifascia, several, August 1 to August 22.

I still have apparently good pupae of

Heliolonche indiana from larvae of 1938 and 1939.
Schinia obscurata " " of 1938 and 1939.
" *gloriosa* " " of 1939.

Gymnopolybia cayennensis (Fabricius) Introduced with Bananas in Texas.—A correction. (Hymenoptera, Vespidae).—In 1939, I reported in this Bulletin (vol. XXXIV, p. 30) the finding of a supposed *Gymnopolybia areata* (Say) in a bunch of bananas at San Marcos, Texas. Only one rather poorly preserved worker or female was received at the time. Recently Mr. James E. Gillaspy sent me two more females (or workers) from the same lot and a more careful examination of these shows that my earlier identification was erroneous. These wasps lack the raised humeral collar of *areata* and have a more slender first tergite. They should be referred to *Gymnopolybia cayennensis* (Fabricius), a social wasp almost as widely distributed as *G. areata.* I have seen *cayennensis* from Brazil, Trinidad, British Guiana, Colombia, Ecuador, Peru, Panama, and the Republic of Honduras.—J. Bequaert, Museum of Comparative Zoölogy, Cambridge, Massachusetts.

REDISCOVERY OF EMESAYA BREVICOXA AND ITS OCCURRENCE IN THE WEBS OF SPIDERS (HEMIPTERA, REDUVIIDAE).

By Robert L. Usinger, University of California, Davis, Calif.

The thread-legged bug, *Emesaya brevicoxa* (Banks), was more precisely defined by McAtee and Malloch (1925), who examined the unique female holotype from Los Angeles, California, now stored in the Museum of Comparative Zoology. The small size and distinctive carinae of the seventh tergite in the female will readily distinguish it from allied species. Thanks to the interest of Mr. George Mansfield I am now able to report additional specimens of this species. *Emesaya brevicoxa* was found commonly at Atascadero, California, in October, 1940. Mr. Mansfield writes that they "were found in cobwebs under house eaves of a cabin." Several last instar nymphs were received from Mr. Mansfield and were kept alive in a breeding cage for five months. They were supplied with miscellaneous arthropods obtained by sweeping in an alfalfa field each week. Although small Hymenoptera, Diptera, and Coleoptera were thus available at all times, *Emesaya* was never observed to feed upon them. Soon after each collection of sweepings was introduced, each thread-legged bug was seen to have captured a spider. The bugs lived thus for months, suspended upside down from spider webs and subsisted, so far as observed, entirely on a diet of various species of spiders. That they never became entangled in the webbing is remarkable considering their large size and apparently awkward locomotion. Uhler (1884) has noted in *Emesaya brevipennis* (Say) the "curious habit of swinging back and forth . . . when lodged on the twig of a tree or bush." In the present case a remarkable up and down movement of the body was frequently observed while the bugs were suspended from the spider webs.

Other Reduviidae which have been recorded as inhabitants of spider webs include the closely related *Emesaya brevipennis* (Say) (Wickham, 1910; Smith, 1910; Howes, 1919); three species of the genus *Eugubinus* Distant in India (Distant, 1904, 1915; Gravely, 1915); *Empicoris vagabundus* (Linn.) (Downes in Parshley, 1921), and *Empicoris rubromaculatus* (Blackburn) (Downes, 1927) in Canada; *Tagalis inornata cubensis* McAtee and Mall. and *Oncerotrachelus acuminatus* Say in Cuba (Fracker and Bruner, 1924); and *Acholla multispinosa* De Geer (Auten, 1925) in Ohio. China and Myers (1929) summarized our knowledge concerning the Heteropterous inhabitants of spider webs and stated that "in no case is it certain whether the eggs, young, or captured prey are the prime attraction." Readio (1927) was likewise uncertain on this point as regards *Emesaya* whereas Howes (1919) considered that captured prey constituted the main food supply.

Wickham (1910) has described the curious contortions assumed by these bugs during mating. Equally sharp bending of the body was observed during ecdysis. The moult from last nymphal instar to adult was observed on January 30, 1941. The nymph was hanging head downward from strands of spider webbing. The body was bent abruptly between the pro- and mesothorax, the under surface of head and the prosternum being pressed against the other thoracic sterna and thus directed backward.

The nymphal skin broke in the usual manner, splitting along the epicranial stem and epicranial arms (Spooner, 1939) and continuing along the middorsal line of the thorax. The head bends forward in front of the epicranial arms. As the moulting bug emerges, first the head and later the pronotum bend downward and backward parallel to the main axis of the body. The adult gradually emerges in this fashion, the front legs and antennae coming out of the front portion while the abdomen and meso- and metathoracic legs emerge from the back portion. While pulling out the middle and hind legs, the femora are bent at right angles near the middle and the tibiae are strongly bowed. When the antennae are free they are grasped, one at a time, by the front legs and pulled so hard that the third antennal segment is strongly bowed. This operation is repeated several times.

The bug is completely free after approximately 30 minutes but remains clinging to the suspended exuviae and to the webbing for nearly three hours before appearing completely pigmented.

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NOTICE—Date of Mailing of Entomologica Americana, vol. XXI, no. 2, for April, 1941.

The actual date of mailing this number to subscribers was **July 28,** 1941. Owing to unforeseen difficulties with presses and folding machines, this number was much delayed beyond July 16, the date of issue as printed on the front cover.

AN ADDITION TO THE NEW YORK STATE LIST OF COLEOPTERA NO. 5. LONG ISLAND RECORDS.

By Borys Malkin, New York, N. Y.

This list is designated as addition No. 5, there having been four others published since the appearance of the New York State List of Insects; three by Mr. K. Cooper (1930–32–35), and one by Mr. J. N. Belkin (1933), all in the Brooklyn Entomological Society Bulletin.

This addition comprises 81 species not previously recorded from Long Island, 13 of which are new to New York State. The names in italics are those of the collectors, records without collector's name were taken by the author. Initials in parentheses are those of the determiners, namely: C. A. Frost—(F), H. B. Leech—(L), J. W. Green—(G), O. L. Cartwright—(C), and the author B. Malkin—(M).

Species new to the State are indicated by an asterisk (*).

Carabidae

849. *Tachys proximus* Say. Wantagh, Jn. (M)
1309. *Celia remostriata* Dej. Brooklyn, May. *Spector* (G)
1430. *Triaena pallipes* Kby. Rockaway, Jl. *Ragot* (M)

Haliplidae

2331. *Peltodytes shermani* Rbts. Wantagh, Jl. (M)
2335. *Peltodytes lengi* Rbts. Flushing, Jn. *Van Nostrand* (M)
2337. *Peltodytes edentulus* Lec. Flushing, Jn. *Van Nostrand* (M)

Dytiscidae

2452. *Hydroporus clypealis* Shp. Wantagh, Jl. (L)
2556. *Agabus taeniolatus* (Harr.). Flushing, Feb. *Ragot* (L)
2601. *Ilybius oblitus* Shp. Wantagh, Jl. (L)

Gyrinidae

2681. *Dineutes horni* Rbts. Montauk, Jn. (F, M)
19258. *Gyrinus rokinghamensis* Lec. Wantagh, Jn. (M)
2687. *Gyrinus aeneolus* Lec. Wantagh, Jn. (M)
2707. *Gyrinus borealis* Aubé. Montauk, Jn. (M)
19250. *Gyrinus latilimbus* Fall. Wantagh, Jn. (M)

HYDROPHILIDAE

2784. *Berosus striatus* (Say). Near Babylon, Jn. *Sherry* (M)
2806. *Tropisternus mixtus* (Lec.) L. I. City, Sep. *Ragot* (M)
2818. *Paracymus despectus* (Lec.). Wantagh, Jl. (M)
2876. *Cercyon praetextatus* (Say). Flushing, May. *Ragot* (M)
2885. *Cercyon pygmaeus* (Illig). Montauk, Jn. (M)
*2888. *Cercyon tristis* (Illig). Wantagh, Jl. (M)

STAPHYLINIDAE

3387. *Omalium rivulare* (Payk.). Massapequa, May. (M)
4450. *Philonthus sordidus* (Grav). Brooklyn, Oct. *Spector* (G)
5678. *Coprothassa sordida* (Marsh). Brooklyn, Oct. *Spector* (G)

SCAPHIDIDAE

6489. *Scaphisoma convexum* Say. Massapequa, May. (M)

HISTERIDAE

6627b. *Hister americanus exaratus* Lec. Brooklyn, Nov. *Spector* (F)
6673. *Phelister vernus* (Say). Brooklyn, Sep. *Spector* (F)
6714. *Carcinops quatuordecimstriata* Steph. Brooklyn, Nov. *Spector* (F)
*6832. *Saprinus semistriatus* Scriba. Brooklyn, Jl. *Spector* (F)
6838. *Saprinus conformis* Lec. Flatbush, Aug. *Spector* (F), Brooklyn, Jl. *Spector* (F)
6875. *Saprinus sphaeroides* Lec. Rockaway, Aug. (M)
6896. *Saprinus patruelis* Lec. Riis Park, *Sherry,* Flatbush, Aug. *Spector,* Montauk, Jn. (all F.)

CANTHARIDAE

7057. *Podabrus frater* Lec. Wantagh, Jn. (G)
7092. *Cantharis excavatus* Lec. Wantagh, Jn. (G), Montauk, Jn. (G)

MORDELLIDAE

7810. *Mordella melanea* Germ. Rosedale, Jl. Bayshore, Jl. *Schott?* (M)
7818. *Mordella lunulata* Hellm. Wantagh, Jn. (M)
*7830. *Glipodes helva* Lec. Wyandach, Jl. Rosedale, Aug. *Schott* (M)

7911. *Mordellistena bihamata* (Melsh). Wantagh, Jl. (M)

ELATERIDAE

8813. *Hemicrepidius decoloratus* Say. Wantagh, Jl. (M)
8964. *Elater mixtus* Hrbst. Bayshore, *Schott?* (M)
8996. *Ischiodontus soleatus* Say. Rockaway, Aug. (M, F)
9051. *Melanotus americanus* (Hrbst). Wantagh, Jn. (M)

DERMESTIDAE

9736. *Dermestes cadaverinus* Fab. Rockaway, Aug. (M)

EROTYLIDAE

10286. *Languria angustata* Beauv. Rockaway, Aug. (M)

COLYDIDAE

10526. *Synchita laticollis* Lec. Southold, Jn. *Cooper* (Schaeffer's collection)

COCCINELLIDAE

*11010. *Scymnus semiruber* Horn. Wyandach. *Engelhardt* (Schaeffer's collection. M)
11077. *Scymnus punctatus* Melch. Babylon, Jn. *Sherry* (M)
11115. *Scymnus terminatus* Say. Wantagh, Jl. (Nunenmacher det.)
*11178a. *Neoharmonia venusta dissimila* Blatch. Alley Pond, Nov. *Ragot & Malkin.* Taken hibernating from under bark of willow tree, among a great number of *Neoharmonia venusta* Melch. (M)
*11179. *Neoharmonia notulata* Muls. Alley Pond, Nov. *Ragot & Malkin.* With the former. (M)

TENEBRIONIDAE

11551. *Bothrotes arundinis* Lec. Nassau beach, Brooklyn, Aug. *Siepmann* (M). Rockaway, Aug. (M)

MELANDRYNIDAE

12535. *Eustrophus tomentosus* Say. Wantagh, Jl. (M)
13082. *Onthophagus orpheus* Panz. Douglaston, Rockaway, Jl. *Ragot* (M)

SCARABAEIDAE

———. *Ataenius falli* Hinton. Rockaway, Aug. (C)
13487. *Phyllophaga ephilida* Say. Rockaway, Aug. (C)

CHRYSOMELIDAE

*15256. *Lema sexpunctata* Olive. Rockaway, Jl. *Ragot,* Aug. *Malkin* (M)
15518. *Cryptocephalus striatulus* Lec. Montauk, Jn. (M)
*15555a. *Colaspis brunnea costipennis* Cr. Montauk, Aug. (M)

CURCULIONIDAE

*16362. *Rhynchites perplexus* Blatch. Montauk, Jn., Aug. (F)
16439. *Apion porcatum* Boh. Wantagh, Jn. (F)
16441. *Apion rostrum* Say. Montauk, Aug. (F)
16486. *Apion puritanum* Fall. Flushing, May. *Ragot* (F)
21450. *Calomycterus setarius* Roelf. Montauk, Aug. Found in great number while sweeping from numerous plants, with *Aphrastus taeniatus* Gyll.
16738. *Sitona tibialis* Hrbst. Flushing, May. *Ragot* (M)
*16804. *Hyperodes cryptops* Dietz. Flushing, May. *Ragot* (M)
*16943. *Smicronyx gibbirostris* Csy. Wantagh, Jn. (M)
17019. *Endalus ovalis* Lec. Flushing, May. *Ragot* (M). Montauk, Jn. *Malkin* (M)
17022. *Onychylis nigrirostris* (Boh.). Flushing, May. *Ragot* (M)
17074. *Tychius picirostris* (Fab.). Flushing, May. *Ragot* (M), Wantagh Jn. (F)
17170. *Balaninus strictus* Csy. Montauk, Jn. *Schuster* (G)
17268. *Anthonomus robustulus* Lec. Wantagh, Jn. Montauk, Aug. (F)
17290. *Anthonomus elongatus* Lec. Wantagh, Jn. (F)
*17284. *Anthonomus decipiens* Lec. Flushing, May. *Ragot* (F)
17335. *Elleshus epiphiathus* (Say). Flushing, May. *Ragot* (M)
17353. *Piazorhinus scutellaris* (Say). Flushing, May. *Ragot,* Wantagh, Jn. (M)
17359. *Gymnetron teter* Fab. Flushing, May. *Ragot* (M)
17360. *Miarus hispidulus* Lec. Wantagh, Jn. (M)
17414. *Lixus marginatus* Lec. Wantagh, Jn. (F)
17562. *Pseudobaris nigrina* (Say). Wantagh, Jn. (F)
17591. *Geraeus penicellus* (Hrbst.). Rockaway, Aug. (L. L. Buchanan det.)
17646. *Limnobaris rectirostris* Lec. Wantagh, Jn. (F)
17735. *Acanthoscelis curtus* (Say). Montauk, Aug. (F, M)

PROCEEDINGS OF THE SOCIETY.

Meeting of January 16, 1941.

An annual meeting of the Brooklyn Entomological Society was held at the Brooklyn Museum, on Thursday, January 16, 1941, at 8:00 P.M. President William T. Davis presided, and seven other members were present, namely, Messrs. Engelhardt, Gaul, Malkin, McElvare, Pallister, Siepmann and Teale; also Messrs. Jay T. Fox, of the Fox Museum, Seaford, L. I., and Daniel Sherry, and Mrs. Pallister and Miss Goodman.

Mr. Engelhardt presented an annual report showing receipts during 1940 of $3015.61 (including the cash on hand carried over from 1939), and disbursements of $2415.10, leaving a balance of $738.60. Subscribers to the Bulletin number 275, and to "*Entomologica Americana,*" 110. They consist largely of institutions, and are therefore dependable and continuous. Nine hundred copies of the "Glossary" have been sold to date. During 1940 twelve copies of Boving and Craighead's "Synopsis of Coleopterous Larvae," and 75 reprints of Mr. Torre-Bueno's "Synopsis of the Heteroptera" were sold. The latter paper is now available only in the regular issue of "Entomologica Americana," the reprints being exhausted.

Mr. Engelhardt also read the annual report of the Publication Committee, prepared by Mr. Torre-Bueno. The usual plea for short notes, ranging in length from a few lines to one typewritten page, was made.

A resolution was adopted to the effect that the report of the Publication Committee be accepted with thanks, and that the secretary be instructed to express to Mr. Torre-Bueno the society's appreciation of his excellent work as editor.

Mr. Edwin Way Teale, reporting for the Nominating Committee, made the following nominations:

Honorary President, Charles W. Leng.
President, William T. Davis.
Vice President, R. R. McElvare.
Recording Secretary, Carl G. Siepmann.
Corresponding Secretary, Dr. George S. Tulloch.
Treasurer, George P. Engelhardt.
Librarian, Dr. Henry Dietrich.
Curator, Henry J. Dietz.
Delegate to New York Academy of Sciences, George P. Engelhardt.

There were no other nominations, and the recommendations of the committee were accepted.

Mr. Pallister spoke on the subject of "Some Interesting Insects," illustrating his informative talk with colored lantern slides.

Among the species shown were the garden spider, the dragon fly, the May fly, the aphis fly, the ant lion, the sand and lubber grasshoppers, *Aradidae,* the walking stick, the Gastroidea beetle, the mourning cloak, the tomato sphinx, the tussock moth, the pronubia moth and the sidewalk ant.

Mr. Davis showed specimens of *Tibicen curvispinosa* and *nigroalbata.* The males of both species are armed with a horn at the tip of the abdomen. This horn is situated on the last abdominal segment, but is not on the uncus.

The meeting adjourned at 9:15 P.M.

CARL GEO. SIEPMANN,
Secretary.

MEETING OF FEBRUARY 13, 1941.

A regular meeting of the Brooklyn Entomological Society was held at the Brooklyn Museum on Thursday evening, February 13, 1941. The meeting was called to order by President William T. Davis at 8:30 P.M. Eleven other members were present, namely, Messrs. Buchholz, Dietz, Engelhardt, Gaul, Malkin, McElvare, Moennich, Naumann, Nicolay, Siepmann and Teale, also Miss Dietz and Messrs. Sidney A. Hessel and Daniel Sherry.

The minutes of the previous meeting were read and accepted. Mr. Engelhardt presented an informal treasurer's report, and spoke briefly for the editorial committee.

Mr. William T. Davis reported the death of Mr. Charles W. Leng, and proposed the following resolution:

Whereas: That we, the members of the Brooklyn Entomological Society have learned with sorrow of the passing of Charles William Leng, one of the incorporators of the Society in 1885, and its Honorary President since December 14, 1922, who died at his home on Staten Island, on January 24, 1941, in the 82nd year of his age, and

Whereas: That we recognize his great services to entomology, particularly as the author of the monumental "Catalogue of the Coleoptera of America, North of Mexico," published in 1920, and

Furthermore, We desire to record our appreciation of his genial character, his wide learning and his ever willing help to fellow students,

Therefore, Be It Resolved: That this resolution be unanimously voted as a tribute to his memory, that it be entered upon the minutes of the society and published in its BULLETIN.

Mr. Engelhardt made a motion that this resolution be adopted, and be forwarded to Mr. Torre-Bueno for immediate publication in the BULLETIN. This motion was seconded and carried.

Mr. Davis also read some notes on the life of Mr. Leng, and on the early history of the Brooklyn Entomological Society, which will be published separately in the BULLETIN. He also showed photographs, newspaper clippings and other items pertaining to the life of Mr. Leng.

Mr. Naumann exhibited a number of specimens of *Catocala,* mostly from Georgia and nearby states, commenting upon the various species. In Atlanta, Georgia, *carissima* is the commonest species, and it occurs in numbers beneath his porch. The second most common species is *maestosa.* Mr. Naumann once found sixty specimens of this species on a single tree. *Sappho* is one of the most prized species of *Catocala.* It occurs locally at Gainesville, Florida. *Consors* is erratic in occurrence, being common some years, and scarce in others.

Mr. Naumann commented in particular on *Catocala illecta,* which feeds on the honey locust. It has been found in St. Louis, Louisville, and Mississippi, and is therefore of wide distribution, but it has never been found in the New York area. He said that he has never found the adults at sugar, nor on any tree. The only way to get them is by beating for the caterpillar, which occurs only on small honey locust trees about a foot in height. Mr. Naumann said it would be interesting if some local collector should turn up *illecta* larvae by beating on small honey locusts.

Mr. Naumann commented upon the large numbers of *Catocalas* that sometimes congregate on a single tree, and other members added similar instances. Mr. Sidney Hessel said that he had found thirty *cordelia* in one day in the Orange Mountains, New Jersey, while ordinarily only a single specimen would be taken in a day. Mr. Hessel also reported taking *Catocala viduata* at Woodmere, L. I., N. Y., on August 5, 1933, a Long Island Record. *Catocala marmorata* was also found at Woodmere, on Sept. 1, 1932, and July 19, 1930.

Mr. Naumann also pointed out that variations in different species of *Catocala* seem to be running along parallel lines and exhibited specimens of the true forms of *palaeogama, innubens, minuta* and *lacrymosa* together with their known variations. For instance, *lacrymosa* f. *paulina* corresponds to *innubens* f. *scintillans* and *minuta* f. *eureka*. *Lacrymosa* f. *zelica* corresponds to *palaeogama* f. *phalanga; lacrymosa* f. *evelina* to *palaeogama* f. *annida,* etc. He expressed the belief that a form of *palaeogama* comparable to *lacrymosa* f. *paulina* may yet be found, possibly through breeding. The same applies to other species in the *Catocala* group.

Mr. Naumann said that *Catocalas* lay large numbers of eggs; 678 eggs were obtained from a single *meskei,* and 820 from a *relicta.*

The meeting adjourned at 9:45 P.M.

CARL GEO. SIEPMANN,
Secretary.

MEETING OF MARCH 13, 1941.

A regular meeting of the Brooklyn Entomological Society was held at the Brooklyn Museum on Thursday, March 13, 1941. President William T. Davis called the meeting to order at 8:30 P.M. Seven other members were present, namely, Messrs. Buchholz, Engelhardt, Gaul, McElvare, Shoemaker, Siepmann, and Teale; also Mr. Daniel Sherry.

The minutes of the previous meeting were read and accepted. Mr. Engelhardt reported briefly as treasurer, and for the editor.

Mr. Davis showed a notebook containing photographs of Cicadas. Concerning variation in the wing venation of Cicadas, Mr. Davis said that some species have a tendency to exhibit variation in a certain place, and not elsewhere. Mr. Davis called attention to *Tibicen bifida,* occurring in Colorado, Utah, Arizona, and Kansas, and the variety *simplex,* known only from Cochise County, Arizona, which differ only in the male genitalia. They are bifid in one case, and not in the the other. Intermediate specimens are known to occur in Cochise County, and Mr. Davis said that distinct species were probably not represented by these forms.

Mr. Engelhardt and Mr. McElvare were the speakers of the evening on the subject of "The Importance of Genitalia in the Naming of Lepidoptera." Mr. Engelhardt spoke on the subject as exemplified by the Aegeriidae or Clearwing Moths, and supplemented his remarks with excellent drawings of the genitalia, and pinned specimens of typical Aegeriidae. Mr. McElvare considered the subject with reference to the Heliothinae of the Noctuid group, and illustrated his talk with slides of prepared genitalia, which he projected on the wall by a lantern slide projector.

Mr. Engelhardt said that the old classification of the Aegeriidae based on external structures, including the venation, was not dependable. In most cases the differences were difficult to express in a form serviceable for a key, and the structures themselves often showed great variation. Specimens, too, were often imperfect, making classification of that individual difficult. For critical and revisional studies, greater dependence can be placed on the internal genitalia. The condition or the size of the specimen make little difference; if the body of the insect is available, the genitalia can be extracted and the insect determined with certainty. The genitalia readily place a specimen in its genus, and then in its species. Mistakes in determination are almost impossible. The genitalia are fixed in each species, but the male genitalia differ more emphatically. In the Aegeriidae, the more important characters of the male genitalia exhibiting variation useful in classification are the harpes, the armature (scales or spines) on them, the sacculus ridge of the harpes, the oedeagus and the vinculum.

The female genitalia require more care in the preparation of sides, and more experience in interpretation. Of value in classification are the bursa, the presence or absence of a signum or spotted area, and the manner in which the ductus and osseum are chitinized.

Where the food plants and biology of the clearwings are known, it bears out the conclusions reached by studies based on genitalia. The peach borer, for example, has been described as several species from coast to coast, but structural and internal characters agree, and only geographic races and color varieties are represented.

Mr. McElvare said that the Heliothinae comprised 175 species, rather small in size, $\frac{5}{8}$ to $1\frac{1}{2}$ inches in wingspread. They are all characterized by spines of some sort on the tibiae of the forelegs. A number of those whose habits are known feed on the flowers and seeds of composite flowers. The external differentiation among the various species is not always great, and the genitalia are useful in classifying them. Mr. McElvare said that the genitalia of the Heliothinae were much simpler in structure and had less armature than those of the Aegeriidae. This was strikingly borne out by a comparison of Mr. Engelhardt's drawings and Mr. McElvare's projected slides.

The technique in preparing slides is simple. It requires a little practice, and perhaps it helps to be shown by someone. Essentially it consists of reducing the chitin in caustic soda, washing out the soda with water, driving out the water with alcohol of increasing strengths, replacing the alcohol with xylol, and mounting them on slides.

In the classification of the Heliothinae the secondary male genitalia, rather than the penis, are the most useful characters. Mr.

McElvare said that he started using the genitalia with the thought of reducing the number of species in this group, but he discovered an additional species through this means. In one case the color variation in a spotted species suggested that the plain white form was only a finial phase. However, the genitalia of the white form are distinctly and consistently smaller in size, although the adult moths are of the same size. In the main species, the vinculum comes to a bold round terminus, and in the white form it comes to a point. In the main species elaborate hair tufts are present which almost obscure the harpes, which hairs are absent in the white form. Prompted by the differences in the genitalia, further examination revealed an external character previously overlooked; certain hair tufts present on the abdomen of one and not on the other. Later structural differences were found in specimens of the larvae at the U. S. National Museum. The food plants, so far as known, are consistently different. Thus many things support the conclusions originally reached through an examination of the genitalia. The meeting adjourned at 9:45 P.M.

Carl Geo. Siepmann,
Secretary.

Meeting of April 10, 1941.

A regular meeting of the Brooklyn Entomological Society was held at the Brooklyn Museum on Thursday, April 10, 1941. President William T. Davis called the meeting to order at 8:30 P.M. Seven other members were present, namely, Dr. Ruckes and Messrs. Buchholz, Engelhardt, Gaul, Malkin, Siepman and Teale, also Messrs. Earl Ehrenreich, Jean Kremer, Fred M. Schott and Daniel Sherry.

The minutes of the previous meeting were read, and Mr. Engelhardt reported as treasurer, and for the editor.

Mr. Davis exhibited a box of Cicadas, embracing the species covered in his 33rd paper, which appeared in the "Journal of the New York Entomological Society," for March, 1941. He also showed an impression made from the fossil, *Davispia bearcreekensis,* from the American Paleocene, the oldest cicada yet known. This fossil, from Bear Creek, Montana, was described by Dr. Kenneth W. Cooper, formerly active in local entomology, in the "American Journal of Science," for April, 1941, and is named in honor of Mr. Davis. Mr. Davis stressed Dr. Cooper's comment that the wings of living cicadas are remarkably stereotyped, and that there is a general uniformity in the proportions of the fore wings in living cicadas. The newly described fossil shows that there has been little change in the venation of cicadas through the ages.

Dr. Herbert Ruckes was the speaker for the evening on the subject of "A Biological Reconnaissance in Florida," illustrating his talk with lantern slides.

Florida is a rather large state which may readily be divided into several floral and faunal areas. The life to be found in the northwestern part of the state in the vicinity of the Apalachicola River is distinctive and differs from that found on the peninsula. The northwestern fauna is like that of southern Georgia, the Carolinas and Alabama. The rainfall appears to be greater here than elsewhere in Florida and the area is subject to more cold and freezing weather. The peninsular region bears a mixture of animal and plant forms, some distinctly endemic. The strictly tropical zone extends from Key West northward along the eastern coast as far as the town of Jupiter, just north of Palm Beach. The northern limit of this narrow band maintains but few strictly tropical species, but certain plants normally found farther south may be found here. Insect life is very abundant and the summer months are exceptionally rich in both variety of species and numbers of individuals. Plenty of opportunity for the existence of a great insect fauna on a very varied flora exists. There are endless good collecting centers. Among the main ones might be mentioned, Orlando, Sanford and the vicinity in the central part of the peninsula, Quincy and Chattahoochee in the eastern panhandle region, Lake Okeechobee and its environs, Royal Palm State Park and of course the various islands of the Keys.

Man has played an enormous role in the biological change in Florida. Great areas of the State have been converted into highly specialized agricultural and grazing areas. The region west of Tallahassee is devoted mainly to cotton, tobacco and pecans; the northwestern part of the peninsula is excellent grazing ground for large herds of good cattle; the region about Gainesville has been converted into tung oil groves; the great "backbone" region of the peninsula is given over, almost entirely to citrus while the neighborhood of Lakeland is sandy with excellent strawberry farms; the border of Lake Okeechobee for a width of several miles has been turned into extensive sugar cane plantations; truck crops of various kinds are now grown in abundance south of Miami in the vicinity of Homestead.

Man's influence cannot be underestimated; hundreds of square miles of the State have been changed in the past quarter century from wild, natural habitats into those of a strictly domesticated nature. Fortunately there are still left great tracts of land where man has made no inroads and it is here that the naturalist must turn for a survey and interpretation of the original and virginal biology of one of our most important States.

Dr. Ruckes stressed that night collecting of Hemiptera with a sweep net was very successful, yielding forms not taken in the daytime, and recommended other entomologists to try it.

The meeting adjourned at 10: 10 P.M.

CARL GEO. SIEPMANN,
Secretary.

EDITORIAL.

HOW TO BECOME A GREAT ENTOMOLOGIST.

Get busy! Describe unintelligibly innumerable "new" species, right or wrong. Then your name will stay fresh in the minds of succeeding generations of workers, to bless or to curse.

> "The evil that men do lives after them;
> The good is oft interrèd with their bones."

J. R. T.-B.

SPECIAL NOTICE TO AUTHORS: All published prices for reprints from this BULLETIN and all gratis reprints are hereby withdrawn, pending adjustment of higher costs shortly to be effective. This change goes into effect as of the date of publication of this number of the BULLETIN.

Publication Committee
of the Brooklyn Entomological Society.

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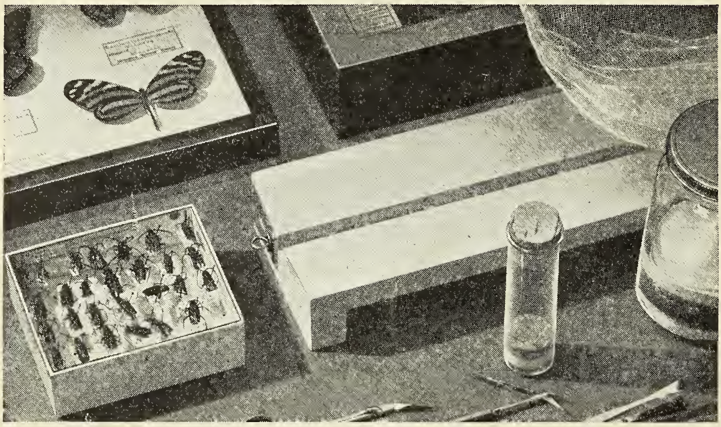

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OF THE

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THE SEVENTEEN-YEAR CICADA, BROOD XV.

By WM. T. DAVIS, Staten Island, N. Y.

In his Seventh Report covering the summer of 1890, Dr. J. A. Lintner, New York State Entomologist, wrote: "The appearance in June last, at Tivoli, N. Y., of the periodical Cicada, *Cicada septendecim,* although in limited numbers, and so far as known not elsewhere observed, was an event of unusual interest to entomologists. It was thought that all the broods that belong to the more densely populated portions of the United States were definitely known and their limits accurately defined. Of these, six pertain to the state of New York;[1] no one of which was due the present year. The Tivoli appearance was therefore unannounced and unexpected. It could not be regarded as a residual of the brood of 1889 [now Brood 14. 1940.], for this only occurs within the state in portions of Long Island, nor as an advance of the well known Hudson river brood, due in 1894 [now Brood 2. 1928–1945]. At the present, it remains as an entomological enigma. Subsequent examinations of records may show it to be the remnant of an unrecognized brood, which in several of its recurrences may have been dwindling in numbers until it is now on the verge of extinction."

On page 297 of the same report Dr. Lintner states that Mr. Frederick Clarkson had written to him on June 7 from Tivoli-on-Hudson, that on that day he had captured on the piazza both sexes of *Cicada septendecim,* "and that at the time of writing (noon) the hum of the insects was quite loud." Dr. Lintner also reported the presence in 1890 of the Seventeen-Year Cicada at Galway, Saratoga County, New York, based on an item in the *Albany Evening Journal.*

In 1890 the Seventeen-Year Cicada also appeared on Staten

---

[1] Eleven broods are now known to occur in the state, some to a very limited extent.

MAR 28 1942

Frederick Clarkson had written to him on June 7 from Tivoli-on-Island. Three pupal skins and an adult were found at New Brighton, and Mr. Charles W. Leng found one on an apple tree near the Moravian Cemetery, as recorded in the Proceedings, Natural Science Association of Staten Island, February 10, 1894, and in the March, 1894, number of the Journal N. Y. Entomological Society. Also in 1890, Prof. John B. Smith reported that the periodical cicada had been taken by several Newark collectors, and had been found in Cape May County, New Jersey.

With the passing years it became apparent that a more simple and practical enumeration of the broods of the periodical cicada than the one in use would have to be adopted in order to prevent confusion, and in Bulletin 18, New Series, U. S. Dept. of Agriculture, Dr. C. L. Marlatt proposed a workable re-numbering of the broods. Thus we have the broods of *septendecim* numbered from 1 to 17, and those of the race *tredecim* from 18 to 30 inclusive. This arrangement, coupled with the year of appearance, serves to clearly designate and separate the different broods.

In applying the new nomenclature it was found, that based on later information, several new broods of the Seventeen-Year race would have to be considered, even though some of the broods were small and unimportant. Under this head came the cicadas that appeared in 1890 and their descendants to appear in 1907, which were designated Brood XV by Dr. Marlatt in his new arrangement. In "The Periodical Cicada," Bulletin No. 71, U. S. Dept. of Agriculture, 1907, a map is given showing the distribution of Brood XV, founded on the 1890 records mentioned, and the possible one from Halifax County, North Carolina.

The summer of 1907 was awaited with much interest; would the Seventeen-Year Cicadas re-appear and thus more firmly establishing the recorded existence of Brood 15?

The cicadas came and in the Proceedings of the Staten Island Association of Arts and Sciences, October, 1907, the writer recorded that on March 31, Mr. Alanson Skinner had given him a pupa found under a stone at Woodrow, Staten Island; that on June 22 he had heard several singing in the trees at Woodrow, and found two pupal skins. On the following day a cicada was heard at Watchogue, at the other end of the Island. Later in the Summer, in the Clove Valley, he and Mr. Henry Bird had each found a pupa skin of the Seventeen-Year Cicada, and Mr. Charles P. Benedict had collected many cast skins and adult cicadas about his home on the Manor Road. In New Jersey the Seventeen-Year Cicadas occurred at Westfield, Plainfield and Newfoundland.

In 1924 we again hoped to find on Staten Island and in its vicinity some evidence of Brood XV, and on June 23, were pleased to hear about six cicadas singing a short distance to the south of the railroad station at Oakwood Heights. Two were also seen in the top branches of young trees. On the same day Mr. Morris Gerst found the right fore wing of a Seventeen-Year Cicada near Greenleaf Avenue, West New Brighton. In New Jersey, Mr. Frederick M. Schott, found on June 16, a dead Seventeen-Year Cicada at Murray Hill.

In 1941 the evidence for Brood XV was quite satisfactory and specimens of adult cicadas were collected at early dates. On May 17, Mr. Carol Stryker found a female cicada at 90 Slosson Avenue, West New Brighton, and on the following day Mr. Harold Brown collected a male and pupa skin in Barrett Park, Staten Island. As the season progressed additional cicadas and pupal skins were found about their home by Mr. and Mrs. K. O. Nesslinger, 960 Fingerboard Road, or were heard singing at West New Brighton. The writer heard them singing at Oakwood close to the 1924 locality, and in the same apple orchard at Woodrow, where they were found in 1907. In New Jersey Mr. Frederick M. Schott heard a Seventeen-Year Cicada singing at Upper Montclair, and found a pupal skin on May 29. Mr. Howard Cleaves heard a number of the cicadas singing near Wanaque Reservoir, June 8. The cicadas were also reported as occurring in numbers near Greenwood Lake on June 7 by Mr. Ernest Shoemaker. On the occasion of the field day of the New York Entomological Society at West Nyack, New York, a Seventeen-Year Cicada was heard singing by the writer, and Mr. Max Kisliuk found a cast skin on a white birch.

It will be seen from the evidence that the doubts expressed by Dr. Lintner in 1890 concerning the cicada brood of that year have been largely settled, and there is certainly a Brood XV of *Magicicada septendecim,* which, however, appears to be one of the smallest broods known. It is no doubt related to the large brood XIV, which appeared as expected in 1940 over an extended area in the eastern and central States. Brood XIV was found in great numbers on parts of Long Island in 1940, but no Seventeen-Year Cicadas were collected on Staten Island in that year.

The map showing the distribution of Brood XV, given on page 61 of the bulletin published by the U. S. Department of Agriculture in 1907, still remains an accurate record of the known distribution of the brood.

FREDERICK LEMMER.

The Brooklyn Entomological Society records with profound regret the death on September 29, 1941, at the age of 65, of Frederick Lemmer, an active and most loyal member since 1921. Born and educated in Germany, Mr. Lemmer came to the United States in the late 1890's to follow his profession as an architect, his activities centering principally in Newark and Irvington, N. J. His leisure hours he devoted to music, literature, painting and in particular to insects, a hobby acquired in childhood as a family tradition. Prepossessing, cultured and genial, he easily made friends. Apparently in vigorous, good health, he nevertheless was afflicted with diabetes of long standing. This he kept under control by judicious, well regulated living, so that no one would have suspected this ailment in him. Gradually letting up on his most arduous professional tasks he gained more time for collecting. His especial interest were moths, and to a lesser degree, butterflies.

His collection grew by leaps and bounds. About 1920 he built himself a cottage at Lakehurst, N. J. His home, modest but attractive, stood in the heart of the pine barren region of New Jersey, long known as an entomological Mecca. His cottage was equipped with a number of contrivances to facilitate collecting and to care for specimens.

As a light trap he had reserved a room in the attic, kept bare of furnishings, excepting a strong light facing a single window with panes so arranged as to give ready access, but no exit. Functioning from sunset to sunrise, this trap gave phenomenal results. During the height of the flying season the walls, ceiling and floor would be cluttered with moths and other insects in the morning. It became a problem what to select and what to reject. Equal success he obtained by sugaring or baiting, a constant pursuit from early spring through summer to freezing weather in late fall and even during warm spells in midwinter. For this purpose he had planned several routes starting from his doorstep and trailing in a more or less circular fashion, one, two and three miles through pine and scrub oak barrens and skirting cranberry bogs and white cedar swamps. At a guess several hundred trees were baited. Smears of bait on the tree trunks, applied day after day and year after year long will bear evidence of his industry. On the nightly rounds of inspection, repeated several times, when warranted, he usually was accompanied by Martha, his good wife, an interested, helpful assistant. Few regions have proven so favorable for collecting by baiting as the environment of Lakehurst. In the aggregate Lemmer's captures are enormous, probably exceeding the combined results of all other collectors in New Jersey. He obtained great rarities in long series, as well as novel species.

By life history investigations and by breeding, often from ova, he corrected the questionable status of many species. His ability was widely recognized. Research workers always could count on his liberal assistance in furnishing material and accurate data. His publications of papers, not numerous or lengthy, for the greater part appeared in the Bulletin of the Brooklyn Entomological Society. Until recently he was in constant attendance at the meetings, always coming prepared with interesting specimens and observations.

The Lemmer collection, as indicated, is enormous. Many thousand specimens at a guess. Of greatest importance and scientific value is the part applying to New Jersey, with an exceptionally fine representation of Noctuidae and Geometridae. Otherwise the collection contains much material from North America and from other continents as well.

What final disposition will be made of the collection we cannot say. We know it was Mr. Lemmer's wish that it may be acquired by a leading institution for safe housing, accessibility and service. Those interested should apply to Otto Buchholz, 493 Markthaler Place, Roselle Park, N. J.

For Mr. Lemmer it can be said that he was born a collector. Indefatigable, resourceful, and discriminating he has rendered valuable service in the cause of entomology. The ranks of his type of amateurs is decreasing fast. He will be missed keenly by his friends and fellow members of the Brooklyn Entomological Society.

Geo. P. Engelhardt,
Scarsdale, N. Y.

THE DISTRIBUTION OF HEMIARGUS ISOLA (REAKIRT) EAST OF THE MISSISSIPPI RIVER.

By Charles L. Remington, The Principia College, Elsah, Illinois.

In the February, 1939, issue of the Bulletin of the Brooklyn Entomological Society, G. W. Rawson and John S. Thomas published an article entitled "The Occurrence of *Hemiargus isola* (Reakirt) in Northern Ohio." The article closed with the remark that further information on the occurrence of this butterfly so far from its previously supposed range should prove interesting. It does.

That same year, on October 19, the author was surprised to capture a perfect male of *H. isola* at Principia College near Elsah, Jersey County, Illinois. This capture, coupled with the aforementioned article led the author to investigate further.

An examination of the better-known entomological publications revealed nothing further on the subject, so correspondence was commenced with collectors throughout the area between the Appalachian region and the Mississippi River. The interesting results are now at hand.

The author has received the data of twenty-eight specimens of *Hemiargus isola* captured in the states of Illinois, Wisconsin, Indiana, Ohio, and Michigan, all far from the previously suspected range of this species.

The published record of three specimens of *H. isola* taken in the "Oak Openings" at Holland, near Toledo, Ohio, is supplemented by the capture of a fresh male at Sylvania, Ohio, on the edge of the "Openings" on September 2, 1939. It is in the collection of Donald Eff of Sylvania. This still leaves the "Oak Openings" as the only known northern Ohio locality for *H. isola.* However, Mr. S. B. Smalley and a friend took six fresh specimens in the fall of 1937 around Cincinnati, in southern Ohio.

The Michigan record of *H. isola* is a single specimen taken by Dr. F. M. Case in Allegan County, Michigan, at Round Lake, about a hundred miles northeast of Chicago, Illinois. All Indiana specimens are from the dune district near Gary. Three individuals were taken there, one at Hessville in 1911, and two at Miller in 1925. The Wisconsin capture is a battered specimen netted by H. M. Bower several years ago at Wauwatosa. Illinois, being nearest to the usual range of *H. isola,* contributes the most instances of occurrence east of the Mississippi. The author's specimen from Principia College, on the Mississippi River has already been noted.

A. G. Lauck took one a few miles away at Pere Marquette State Park and another at Eldred in adjacent Greene County in 1936 and 1937 respectively. In 1901 a fresh pair was taken thirty miles south of Principia College at Falling Springs by C. L. Heink.

Aside from these five taken in central-western Illinois, all other Illinois records are from the dune district near Chicago. Dr. John A. Comstock writes that he took several *H. isola* around Evanston prior to 1900. A male was taken in Chicago proper in 1917, two were taken at Elgin, and one at Arlington Heights in 1934, and two at Zion (in 1914 and 1934).

In surveying this and other data, it is seen that all available records are from four main spots: (1) the dune region in a crescent-shaped area around the southern end of Lake Michigan; (2) the dunes at "Oak Openings" in Ohio; (3) the vicinity of Cincinnati; and (4) the vicinity of Principia College near Alton, Illinois. It appears probable that thorough collecting would fill in these gaps between the corners of a rough square. The present spottiness is due very likely to insufficient coverage of the area. It should also be pointed out that *H. isola* often passes unnoticed by collectors since it resembles the abundant *Everes comyntas* (Godart) on the wing.

Extensive correspondence with entomologists east of the Mississippi and south of Cincinnati has revealed no occurrences of *Hemiargus isola* in the South. A related species, *Hemiargus hanno* (Stoll), occurs at least as far west as Mobile, Alabama. It may be that *H. isola* reaches eastern Louisiana from Texas, but the other southern states are presumed to be out of even the accidental range.

The periods of flight of *H. isola* east of the Mississippi River are somewhat uncertain. I have before me records of fresh specimens taken in every month from March through October. The March examples are from the eastern edge of Missouri, a short distance across the state line from Principia College. On March 24, 1907, at least ten perfect specimens including both sexes of *H. isola* were taken by C. L. Heink at this locality near the Illinois state line. This instance is cited because of the proximity to the area dealt with in this paper.

Three broods are represented, and in Jersey County, Illinois and at Cincinnati, Ohio, the heights of flight appear to be these:

First brood—early April
Second brood—late June
Third brood—late September

In the more northern localities (around Chicago and near Toledo), these broods each seem to be two to three weeks later. During some years, the seasons are later or earlier by a week or two than the above dates, as is clearly shown in the records at hand.

With the data of the known captures of *H. isola* set forth, the question arises: What is the explanation of the surprising appearance of Reakirt's Blue east of the Mississippi River. Here is an hypothesis containing an answer to the problem: It appears that *Hemiargus isola* is a common butterfly from the Pacific Coast to a north-south line running through Omaha, Nebraska and Kansas City, Kansas. In the states of Iowa, Missouri, and Arkansas it is of spasmodic occurrence, though present as a breeder, not a migrant. From the Mississipi River to the states of Michigan, Ohio, and probably Kentucky it is very rare, though certainly a breeder in these states. Within this last region there are certain well established colonies in sand dune habitats. The only two of these dune colonies known at present are at "Oak Openings" in Ohio, and around Chicago, but *Hemiargus isola* is to be expected in other such localities. With the exception of the dune colonies, the butterfly is a very rare, but widely distributed insect.

Even in its citadels in the Great Plains and California, the food plants of *Hemiargus isola* still remain unknown. When this is known, it seems likely that the plant will be found to be common in the dune regions and very uncommon elsewhere in the East. The almost invariable captures of fresh, perfect males and females of the delicate Lycaenid rules out the probability of movement, either migrational or wind-propelled.

Before the subject of the eastern occurrence of *Hemiargus isola* can be closed, two more things must be done: (1) the food plant must be determined; and (2) careful examination of all Lycaeninae must be made in the field in order to sift out specimens of the rare *H. isola.* The latter should fill in the area covered by this paper.

ON COLOR CHARACTERS AS SPECIFIC CRITERIA.

It may at times seem that the writer lays overmuch emphasis on the fallibility of color descriptions of insect species. Seeing is believing, so here is a current example.

A recent revision of the coleopterous genus *Buprestis* yields these amazing figures. In this genus there have been, as listed by the reviser, 115 species described; of these, only 24, slightly more than 20%, are valid; 91, or nearly 80% are invalid redescriptions of the 24 valid species! On the face of the color specific names *alone,* 35 species were described by color; only 9 of these are valid. That is, about two-thirds of these descriptions were on an unstable basis!

This is a purely factual argument. Color is at times a useful supporting character. We must always try to bear in mind that a species is a definite entity, and that a change in color does not indicate a change in being. Were the last true, a red-faced man would be a different species from a pale man, which is absurd; he would even be specifically different from his original paler self; which is ridiculous. A man tanned by sun and wind would differ specifically from his own white-skinned sheltered children—another patent absurdity.

The latent fallacy in a color-description lies in an ingenuous belief in the fixity and permanence of color. But it is common knowledge that color in insects is in general physiological; that it depends on many factors—age, food, temperature, season, and on numerous other factors, some known, others not. Exception is here specifically made of structural colors; and even these may be individual or group departures from the norm, brought about by external causes.

The writer often wonders what the species concept really is. Current ideas on the subject are as full of subjective concepts and cloudy verbiage as the brain-children of an adept metaphysician.

Let anyone who is in disagreement with these remarks searchingly examine his own idea of what really makes a species a species; and then come out boldly to objectively controvert these remarks.

Species are real entities; or they are not. Species exist objectively in the material plane; or they exist subjectively only and are no more valid than the hasheesh-eater's dreams of the Houris in Paradise. J. R. T.-B.

THE DIPTEROUS GENUS CAMPSICNEMUS IN NORTH AMERICA.[1]

By F. C. Harmston and G. F. Knowlton.[2]

Flies of the genus *Campsicnemus* are small, rarely exceeding 2.5 mm. in length. They often are found running about on the surface of still water, much as do *Hydrophorus*. On several occasions the writers have collected specimens from the surface of snow banks. Males of many species possess distinctive secondary sexual modifications, especially prominent on the legs, making the genus of special interest to students of natural history.

The following report includes a key to males of species occurring in North America. In addition are descriptions of three apparently undescribed species, synonymy notes, and additional distribution records for several species.

Key to the Males of North American Campsicnemus

1. All femora black, though tips may be narrowly yellow 2
   At least one pair of femora one-half yellow 5
2. Middle tibiae greatly thickened and "deformed," bearing a flattened lobe-like projection on outer anterior edge near apex .... *vanduzeei* Curran
   Middle tibiae of nearly equal thickness throughout, not greatly "deformed" 3
3. Wings with a conspicuous brown spot on last section of fourth vein .... *nigripes* Van Duzee
   Wings without such spot 4
4. Halteres blackish; middle basitarsi curved somewhat in the shape of a semicircle .... *curvispina* Van Duzee
   Halteres yellow; middle basitarsi not or but slightly curved **melanus** n. sp
5. Middle tibiae wholly black, greatly thickened near the middle *oedipus* Wheeler
   Middle tibiae yellow basally, at least 6
6. Middle tibiae greatly thickened and "deformed," at least near middle 7
   Middle tibiae not, or scarcely thickened 9

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[1] Contribution from the Department of Entomology, Utah Agricultural Experiment Station.

[2] Graduate assistant and research associate professor of entomology, respectively.

7. Middle tibiae greatly thickened, deeply excavated near apex, bearing in hollow of the excavation a conspicuous peduncled process .... *philoctetes* Wheeler

Middle tibiae without such a peduncled process near the apex 8

8. Middle basitarsi curved in the form of a semicircle; wing without a spot on last section of fourth vein *thersites* Wheeler

Middle basitarsi not strikingly curved; wing with a conspicuous brown spot on last section of fourth vein *claudicans* Loew

9. Fore tarsi with second joint bearing a long laterally projecting filament, this being as long as remaining joints of tarsi 10

Fore tarsi without a laterally projecting filament 11

10. Antennae, including arista, entirely black; fore tibiae wholly black .... *bryanti* Malloch

First joint of antennae yellow; apical one-fifth of arista fringed with delicate white hairs, appearing silvery; fore tibiae yellowish .... *americanus* Van Duzee

11. Fore basitarsi bearing a row of long hairs on lower surface, these hairs as long as second joint of tarsi; third antennal joint sharply pointed .... *hirtipes* Loew

Posterior basitarsi and second joints each with a row of delicate cilia on lower surface (fig. 5); these cilia pale, hooked at tip. .... *degener* Wheeler

Neither the fore nor posterior basitarsi with prominent cilia on lower surface 12

12. Middle tibiae with outer surface densely covered with long hairs, those on outer-posterior surface delicate, curled *arcuatus* Van Duzee

Middle tibiae not densely covered with long curled hairs on outer surface 13

13. Fore femora blackened on basal half; middle tibiae with a black, wart-like protuberance on outer-anterior surface (fig. 6), slightly beyond middle .... **montanus** n. sp.

All femora wholly yellow 14

14. Fore coxae wholly yellow; wings without a brown spot on last portion of fourth vein .... **utahensis** n. sp.

Fore coxae blackish; wings with a faint brown spot on last section of fourth vein .... *wheeleri* Van Duzee

Campsicnemus melanus n. sp.

Male: Length, 2 mm.; of wing, 2.5 mm. Face yellowish brown, narrow, especially near the middle where the eyes appear approximated. Front metallic black with purple reflections, especially prominent along the orbits. Antenae black; third joint nearly triangular, slightly longer than wide, pubescent; arista basal. Inferior orbital cilia white; the upper cilia are black and descend to about one-half the eye height.

Dorsum of the thorax black, dusted with brownish pollen, an indistinct bluish line shows through the pollen between the rows of minute acrostichal bristles; pleura black, densely grayish pollinose. Abdomen black with bronze reflections on dorsum, the lateral margins lightly dusted with grayish pollen. Hypopygium imbedded; only a brown, downwardly-directed filament projects.

Coxae and all of legs black, the tips of all femora narrowly yellowish; middle tibiae (fig. 8) when viewed from behind somewhat flattened, bearing a few conspicuous bristles near the middle on outer surface and a more prominent bristle slightly beyond the middle. Middle basitarsi scarcely curved, bearing a prominent black spur-like projection at tip on upper surface, fringed along entire upper surface with black hairs which are nearly as long as the width of basitarsi. Otherwise the legs are of plain structure. Joints of fore tarsi as 8–4–4–2–3; of middle tarsi as 8–4–4–3–3; of hind tarsi as 7–7–5–3–3. Calypters and halteres yellow, the former with black cilia.

Wings grayish hyaline; third and fourth veins slightly diverging beyond the cross-vein; the length of cross vein compared to last section of fifth vein is as 6 to 10; last section of fourth vein without indication of a spot; anal angle evenly rounded, prominent.

Female: Slightly larger than the male; otherwise like it in general external appearance except that the middle tibiae are of plain structure.

Described from six males and two females all taken in Utah. Holotype male, allotype female and one female paratype taken at Torrey, August 20, 1939; three paratypes from Callao, September 18, 1938; two paratypes from Mt. Home, July 19, 1940, all collected by G. F. Knowlton and F. C. Harmston. Holotype and allotype deposited in the U. S. National Museum; paratypes in the insect collections of the Utah Agricultural Experiment Station, the California Academy of Sciences and the University of Kansas.

Taxonomy: Campsicnemus **melanus** n. sp. resembles both *C. nigripes* V. D. and *C. curvispina* V. D., in general appearance. *C. nigripes* differs from *curvispina* and **melanus** n. sp. in having a conspicuous brownish spot on the last section of fourth wing vein (fig. 2), and in having the middle tibiae conspicuously flattened near the middle (fig. 1). The black halteres in *curvispina* will readily distinguish it from either *nigripes* or **melanus** n. sp.

Campsicnemus utahensis n. sp.

Male: Length, 2 mm.; of wing, 2.2 mm. Face brown, very narrow on central portion, where the eyes are approximated; immediately below the base of antennae the greenish ground color shows through the thick brown pollen. Front black, metallic, with purple reflections; narrowly greenish along the orbits. Antennae (fig. 9) black, third joint longer than wide, pubescent. Inferior orbital cilia white, the upper ones black.

Dorsum of thorax metallic, black, a central vitta and the dorsum of scutellum greenish; pleura greenish-black, dulled with gray pollen. Abdomen dull green, the dorsum with bronze reflections, lightly dusted with gray pollen. Hypopygium small, embedded.

Fore coxae yellow, the outer edge with a row of black hairs of increasing length which begin near the base and end in the apical bristles; inner portions with delicate pale hairs (easily overlooked). Middle and hind coxae black. Femora yellow, the middle pair slightly thickened and bearing a row of about five bristles on outer apical one-fourth, these ending in the preapical bristle; posterior femora with a single preapical bristle. Tibiae yellow, the extreme base and apex of fore and hind pairs blackened; middle tibiae (fig. 3) scarcely thickened, the extreme base and apical half blackened, bearing a single long bristle on outer surface slightly beyond the middle and a few scattered bristles nearer the base. Tarsi wholly black, fore and hind pairs simple; middle basitarsi with a row of rather prominent hairs on upper surface, the apex with a prominent sharp spur-like projection. Joints of fore and middle tarsi as 7–3–3–2–2; of posterior tarsi as 8–6–4–3–3. Calypters and halteres yellow, the former with black cilia.

Wings grayish hyaline, without spots or infuscations; length of cross vein as 4, the last section of fifth vein as 9; anal angle moderately prominent, evenly rounded.

Described from 7 males, all taken in Utah. Holotype and 4 paratypes taken at Heber, May 29, 1940; two paratypes taken at Torrey, August 20, 1940, all by G. F. Knowlton and F. C. Harmston. Holotype deposited in the United States National Museum; paratypes in the insect collections of the Utah Agriculture Experiment Station and the California Academy of Sciences.

Campsicnemus utahensis n. sp. is much like *C. arcuatus* V. D. in color of body and legs; it is distinguished from the latter, however, in the chaetotaxy of the middle tibiae which in *arcuatus* (fig. 7) are densely haired on the entire outer surface, these hairs being delicate and curled at the tips; in *utahensis* the outer surface of the middle tibiae (fig. 3) possesses but a few scattered hairs near the middle and a single prominent bristle.

Campsicnemus montanus n. sp.

Male: Length, 1.5 mm.; of wing, 1.9 mm. Face brownish pollinose, short, leaving the lower portion of eyes sharply exposed, narrow, especially near the middle where the eyes appear approximated. Front black with purple reflections, dulled with thin gray pollen. Antennae black, the third joint small, about the length of first joint, broadly rounded at tip. Orbital cilia black, the lower cilia appearing brownish in certain lights.

Dorsum of thorax brown, dusted with yellowish pollen, a central vittum and the margin of scutellum appearing purple; scutellum with a single pair of marginal bristles; pleura dark blue-gray, densely grayish pollinose. Abdomen dark brown, somewhat flattened dorso-ventrally; hypopygium small, embedded.

Coxae concolorous with pleura, the tips of fore pair narrowly yellowish; fore and middle coxae with delicate brownish hairs on anterior surfaces, and several black bristles at tip. Fore femora blackened on basal two-thirds, the apical third brownish-yellow; middle femora dark yellow, infuscated on basal half of lower edge; posterior femora wholly yellow, bearing a single preapical bristle. All femora of plain structure. Tibiae dark yellow, fore and hind pairs of plain form; middle tibiae (fig. 6) gradually thickened toward the middle, this thickened portion ending in a short black wart-like protuberance on the outer-posterior surface, somewhat beyond the middle; the basal portion on inner edge bears a row of about eight short, blunt hairs. Tarsi wholly brownish; middle basitarsi somewhat curved, bearing a conspicuous black, spur-like projection at tip. Joints of fore tarsi as 11–3–2–2–3; of middle tarsi as 6–5–3–2–2; of hind tarsi as 5–6–4–3–3. Calypters and halteres brownish, the former with dark cilia.

Wings grayish hyaline, evenly tinged with brown; third and fourth veins appear parallel from slightly beyond the crossvein; the latter situated before the middle of wing, its length as compared with the last section of fifth vein as 3:8; anal angle evenly rounded, moderately prominent.

Described from a single male taken September 8, 1940, at Gardiner, Montana, by F. C. and V. H. Harmston. Type deposited in the U. S. National Museum.

This species is distinguished from others occurring in North America by its small size and the presence of a small, black wartlike projection on the outer-posterior surface of middle tibiae.

Peloropedes brevis (Van Duzee)

Kophosoma brevis Van Duzee, Trans. American Ent. Soc. 52: 45, 1926.

Campsicnemus crassitibia Van Duzee, Amer. Mus. Novit., no. 439: 1, 1930.

Curran (Amer. Mus. Novit., no. 682: 7, 1933) places *crassitibia* in the genus *Peloropedes,* stating that it did belong in *Campsicnemus,* and that it is synonymous with *K. brevis.*

Dolichopus plumipes (Scopoli)

Musca plumipes Scopoli, Entom. Carneol., p. 334, 1763.

Dolichopus sequax Walker, List Dipt. Brit. Mus., 3: 666, 1849.

Campsicnemus sequax (Walker) Aldrich, Catalogue of North American Diptera. Smithsonian Misc. Coll. no. 1444: 291, 1905.

Dolichopus plumipes (Scopoli) Parent. Ann. Mag. Nat. Hist., Ser. 10, Vol. 13: 29, 1934.

Parent examined the type of *sequax* and considered it synonymous with *plumipes* Scopoli. This species has a wide distribution, having been collected by the writers in California, Colorado, Idaho, Oregon, Washington and Utah. They have also examined material from Alaska, various localities throughout Canada, Maine, Michigan, Minnesota, South Dakota, Wisconsin, Iowa, Illinois and Arkansas.

Campsicnemus curvispina Van Duzee

Campsicnemus calcaratus Van Duzee, Proc. U. S. Nat. Mus. 63: 3, 1923.

Campsicnemus curvispina Van Duzee, Amer. Mus. Novit., no. 439: 2, 1930.

Because the name *calcaratus* was preoccupied by *C. calcaratus* Grimshaw, 1901, a species described from Hawaii, Van Duzee proposed the new name *curvispina* for his species.

Campsicnemus americanus Van Duzee. Described from Alaska. Specimens taken at Ottawa, Ontario, Canada, May 31, 1923, by Dr. C. H. Curran, and lent by Prof. E. H. Strickland, were examined by the writers.

C. claudicans Loew. This species was described from Alaskan material and since has been reported from Alaska by Van Duzee. Wheeler reports the species from Craig's Mountain, Idaho. The writers have examined specimens from Tacoma, Washington and Coeur d'Alene, Idaho (F. C. and V. H. Harmston).

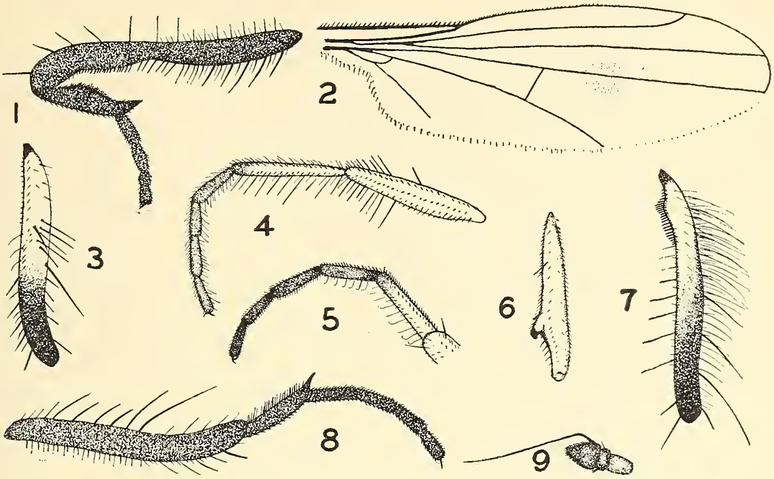
C. degener Wheeler. Wheeler described this species from material taken in California and Idaho. Van Duzee recorded it from Alaska. It evidently is a widely distributed species in western United States, having been taken by the writers at Boulder, Floy, Logan, Manila, Manti, Richfield, Scipio and Willard in Utah, from June to September; at Evanston, Wyoming in July; Gould, Colorado in August; Prescott, Arizona in April; Dixie, Oregon and Olympia, Washington in September.

C. hirtipes Loew. Described by Loew from material taken in Pennsylvania. Numerous specimens from Iowa and Illinois have been examined by the writers, taken by B. Berger in August and September.

C. nigripes V. D. This species has been taken by the writers in the following Utah localities: Logan, Moroni, Nephi, Price, Randolph, and Roosevelt, from May until September; at Prescott, Arizona in April; Muir Woods, California, in November; and Butte, Montana in September. It was originally described from California material.

C. philoctetes Wheeler. The type localities are South Dakota and Wyoming. Many specimens have been collected by the writers in the following localities: Logan, Randolph, Roosevelt, Trout Creek, and Washakie in Utah, from July until September; at Union and Pendleton, Oregon; Preston and Boise, Idaho; and Tacoma, Washington, in September.

Campsicnemus nigripes V. D., male, 1–2. *C. utahensis* n. sp., male, 3, 9. *C. hirtipes* Lw., male 4. *C. degener* Whlr., male, 5.



C. montanus n. sp., male, 6. *C. arcuatus* V. D., male, 7. *C. melanus* n. sp., male, 8.

C. thersites Wheeler. Described from Wyoming specimens. It has been collected by the writers at Garden City, Kingston, Logan, Mountain Home, Price and Randolph, in Utah, from July until September; at Bozeman, Montana, and Boise, Idaho, in September.

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A SERIOUS OUTBREAK OF THE FALL CANKER WORM, ALSOPHILA POMETARIA HARRIS, DUE IN 1942.

By George P. Engelhardt, Scarsdale, N. Y.

Following a yearly succession of declines the Fall canker worm again has appeared in alarming numbers in the Fall of 1941. This forecasts a repetition of defoliation of trees and shrubs this spring.

In Westchester County, New York, the winged males and the wingless females of this notorious moth were observed in late October and from then on in rapidly increasing numbers through November and December. On a whitewashed post in a wooded section eighteen females were counted depositing their egg clusters and on the next post fifteen. On tree trunks the moths, in both sexes, were equally common, though less easily discernible. A warning should be sounded and a campaign started now. Do not wait until the larvae, emerging in the Spring, are well-advanced in their work of defoliation. There is no remedy for damage done.

Check measures, proved most effective, still are the banding of trees with sticky fly-paper or a slow-drying mixture of glue. This should be applied about five feet above the ground. The moths only exceptionally ascend tree trunks to greater heights. Above this sticky band should be added a ring of loose cotton, taped with strong, water-resisting paper. Both should be applied in the Fall for trapping the moths and again in the Spring before the larvae emerge.

Aphids in Buprestid Burrow.—Masses of aphid bodies were found to be closely packed into burrows of flat headed borers inside dead limbs of Austrian pine, examined at Logan, Utah, on March 3, 1936, by T. O. Thatcher. In one tunnel, most of the dead aphids were wingless *Capitophorus, Macrosiphum* and *Aphis* sp.; this burrow contained two living larvae, apparently entomophagous Hymenoptera. The adult "wasp" had evidently provisioned her burrow with the aphids.

Three additional tunnels also were found which had been provisioned with aphids, mostly *Rhopalosiphum* and *Macrosiphum* species. No entomophagous larvae were found in these latter three buprestid burrows.—George F. Knowlton, Utah Agricultural Experiment Station, Logan, Utah.

A BRUTAL WAY TO CLEAN INSECTS.

By J. R. de la Torre-Bueno, Tucson, Ariz.

At some time or another, everyone of us has had to cope with the ravages of mold in collections. Mold *always* attacks the most interesting specimens and ruins them for study. It is possible to try to clean them, but in general, soft-bodied insects are beyond redemption. Brushing the wings of Lepidoptera is not to be recommended—they never look the same. Delicate Diptera are gone past hope. But hard-bodied insects withstand rougher treatment and with them it is possible to get rid of the bulk of the moldy whiskers. The mold-plague struck me in a big way as a result of the dampness caused by the flooding of my basement study by a cloudburst two years ago. Very many bugs were badly molded and covered with the usual tangle of long micelia and spores. Several ways of cleaning them, such as washing in benzene or in carbon tetrachloride (CCl_4), were tried with moderate results. Finally, as a desperate drastic measure, a few hard-bodied forms were subjected to brutal treatment, with astonishingly good results.

The bugs were put into strong—*saturated*—solution of a commercial washing powder (sold as "Oakite"), on a kill-or-cure principle. The results were fine! The strong alkaline solution (trisodium phosphate with a little soda-ash) ate away all the mold, or softened it so it could be cleaned off by means of a fine sable brush (#0 or #00). Later straight trisodium phosphate was used in place of Oakite. The insects are left in the solution anything up to 24 hours, and any adhering remnants of mold are washed off with the solution by means of the brush. The insects are then put into a large quantity of clear water (say a pint) and left in this for an hour or more, until the alkali is removed. At this point, on taking out of the water, any remnants of mold are removed and the insect is thoroughly rinsed in clear water. It is then put on a good absorbent blotting paper, or on filter paper, which is better, and when the surplus water disappears, it is pinned and allowed to dry thoroughly before being put back in its proper box.

It is well to have plenty of naphthalene in the box. It has been found in the excessive moisture-content of the air in British India that this chemical in abundance in boxes prevents the growth of mold.

No fear of breaking off delicate legs or antennae need be experienced. The water holds them up at first and cushions them; and later, the insect is completely softened and pliable.

One good—and unexpected—result is that insects appear to be thoroughly degreased by this treatment. On the other hand, occasionally the fats turn gray on the surface of the insect. However, as a moldy insect is a lost insect, its recovery, even if slightly discolored, is better than no insect, especially if it is a rare specimen. Structures do not seem to be clouded by this film, even though color is obscured.

Warning: Proceed very cautiously with soft-bodied bugs or beetles, especially in the former such things as delicate Miridae and the minute Anthocoridae. But if these seem beyond help and useless, try it. Insects glued on points come off, so it is well to be careful not to soak together lots of insects on points from different localities—you are sure to be lost if you do. In fact, do not put in to clean more specimens than you will have time for when they come out of the cleaner.

Do not leave either in the solution or in plain water over 24 hours —insects decay rapidly under these conditions, especially in hot weather.

And for the last point, put the specimens in, pins, labels, and all. Labels are beautifully clean and bleached when they come out of the wash; and pins are bright (except steel pins). But be sure *not* to put in labels other than printed labels or labels written in water-proof ink. Any other ink is washed off.

In conclusion, desperate diseases need desperate cures. A bug that is ruined by mold may be saved and beautified from this treatment. If the treatment does not succeed, the insect was gone, anyhow; and nothing is lost by trying.

Butterfly Collecting Records.—*Incisalia polios* Cook & Watson. Abundant on Wolf Hill in the Helderberg Mountains, 12 miles west of Albany, N. Y. The first was taken on May 2, 1938, at an elevation of approximately 1600 feet, where its foodplant, *Arctostaphylos uva-ursi* Cockerell, is widespread.

Poanes yehl Skinner. Locally common in the marsh along both of U. S. Highway 17, just beyond the bridge over the Perquimans River north of the town of Hertford, No. Car. Twenty males and two females were taken in one hour's stop, on July 15, 1941.—A. C. FREDERICK, Albany, N. Y.

THE THORACIC STRUCTURE OF PSEUDOGYNES OF FORMICA SANGUINEA LATREILLE (HYMENOPTERA, FORMICIDAE).

By George S. Tulloch, Brooklyn College, Brooklyn, New York.

Forms intermediate between the winged queen and wingless worker have been reported from colonies of *F. sanguinea* infested by Staphylinid beetles of the genera *Lomechusa, Atemeles,* and *Xenodusa* by Wasmann,[1] who proposed the term "pseudogyne" to include these anomalous individuals. Later[2] he distinguished three classes of pseudogynes: micro- and mesopseudogynes which are small or medium-sized with convex or humped mesonotal areas but without wings, and macropseudogynes, which resemble the normal females but have short or vestigial wings. The purpose of this paper is to record the thoracic changes which have accompanied the development of the apterous condition in this species.

The specimens of this series were studied in a liquid medium (water and glycerine) with the aid of a binocular microscope. The scale drawings were made with the aid of a cross-line ocular micrometer disc and graph paper. The specimens were made available through the generosity of the late Professor William M. Wheeler.

The winged queen and the wingless worker are the usual female forms present in the colony of *F. sanguinea.* The thorax of the female (Fig. 1) is characterized by the presence of a well-developed mesothorax which accommodates the large muscles used in the movement of the mesothoracic wings. The metathorax is reduced in size as are the metathoracic wings. The thorax of the worker (Fig. 8) is only a fraction of the size of that of the queen and exhibits an almost complete fusion of parts. The pronotum is the only region which maintains its identity.

The intermediate forms or pseudogynes illustrate the progressive changes that accompany the transition from the alate to the apterous condition. The first change is a general reduction in size and a partial fusion of the sclerites in the mesonotal and mesapleural re-

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[1] 1895. Die ergatogynen Formen bei den Ameisen und ihre Erklarung. Biol. Centralbl. 15: 606–646.

[2] 1909. Zur Kenntniss der Ameisen und Ameisengaste von Luxemburg. III. Verzeichniss der Ameisen von Luxemburg mit biologischen Notizen. Arch. Trimestr. Inst. Gr. Duc. Luxemb. n.s. 4: 1–103, 5 pls.

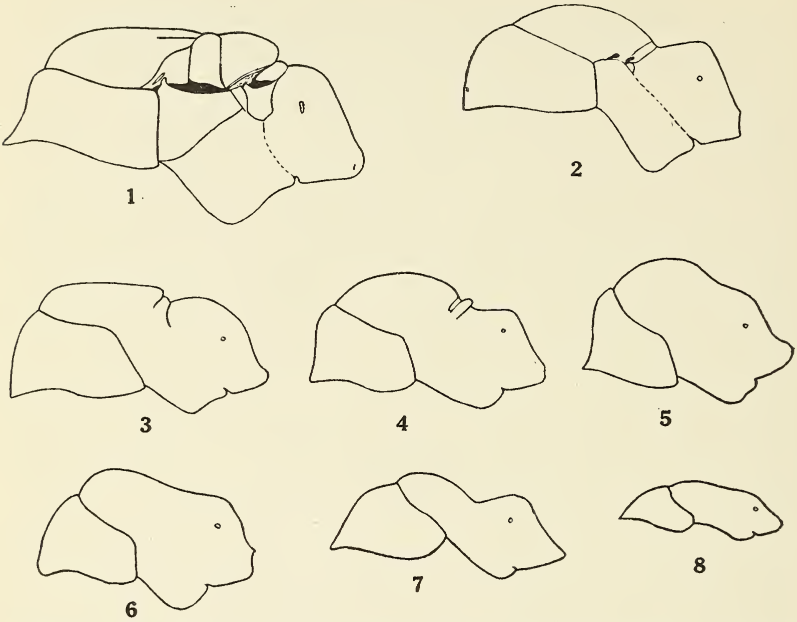

Fig. 1. Thorax of *F. sanguinea* queen (wings removed). Figs. 2–7. Thoraces of pseudogynes. Fig. 8. Thorax of worker.

gions accompanied by a reduction of the wings to vestiges (Fig. 2). This is followed by a partial fusion of the mesothorax with the metathorax both in the notal and pleural regions accompanied by a further reduction in size (Figs. 3, 4). A further step is the complete fusion of the mesothorax with the metathorax (Fig. 5). Final steps in the progressive change is a reduction in size (Figs. 6, 7) approaching the condition found in the worker (Fig. 8). The tendency for the forms to blend into one another indicates that the division into three categories by Wasmann,[3] using thoracic characters, is an arbitrary one.

Wasmann[3] suggested that the presence of these pseudogynes was due indirectly to the activities of the Staphylinid beetles. The larvae of these beetles are predacious forms which devour the ant larvae. He postulated that the worker ants in an endeavor to maintain the normal proportions of queens and workers attempt to convert queen larvae into workers (micro- and mesopseudogynes) or worker larvae into queens (macropseudogynes). The absence of pseudogynes in some infested *F. sanguinea* colonies and their presence in other infested colonies.[4, 5] weakens this trophogenic explanation of pseudogyne production. A more tenable explanation is that these forms are "intercastes" as the discovery of gynergates (a lateral mosaic female-worker anomaly) by Tulloch[6] and Wheeler[7] offers strong evidence to support the theory that in the ants the worker and queen castes are germinally determined.

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[3] *Loc. cit.*, 1909.

Insects in Killdeer Stomach.—A killdeer, *Oxyechus vociferus vociferus* (Linn.), was collected on the edge of a pond approximately one and one-half miles northwest of Dolomite, in Tooele County, Utah, August 4, 1941. Twenty minutes later the stomach (gizzard) was removed from the dead bird and placed on a square of gauze, while the collection data was being written on a tag, before preservation of the stomach in alcohol. The writer was surprised to see a very large living Tabanidae larva, undoubtedly *Tabanus punctifer* O.S., the largest species occurring in this area, issuing from the oesophagal opening of the removed stomach. Two living larvae, Stratiomyiidae (Det. Dr. A. Peterson), also had partially emerged from the same opening. Additional contents consisted of 7 smaller Tabanidae larvae (*Chrysops fulvaster* adults were extremely abundant in this area at the time and for at least three weeks thereafter), 13 Stratiomyiidae larvae, 9 Chironmidae larvae, 6 larval and 1 adult Trichoptera, 7 Corixidae, 3 Notonectidae, 1 leafhopper, *Cicadella hieroglyphica* Say, 2 larval Lepidoptera, 2 ants, and 1 Odonata, a damsel fly. The stomach also contained 1 spider, 9 Crustacea, and numerous unidentified insect fragments. This stomach was unusually large and full.—George F. Knowlton, Utah Agricultural Experiment Station, Logan.

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[4] Wheeler, W. M. 1910. Ants: Their Structure, Development and Behavior. Columbia University Press, N. Y.

[5] Wheeler, W. M. 1937. Mosaics and Other Anomalies Among Ants. Harvard University Press, Cambridge, Mass.

[6] 1932. A Gynergate of Myrmecia. Psyche 39: 48–51, 3 figs.

[7] *Loc. cit.*, 1937.

NOTES ON FABRICIELLA WITH DESCRIPTIONS OF FIVE NEW SPECIES (TACHINIDAE, DIPTERA).[1]

By H. J. Reinhard, College Station, Texas.

The new species described below are all assigned to *Fabriciella,* but it should be stated that the first four listed are closely allied to *Echinomya palpalis* Coquillett, which Townsend has designated the type species of *Metopotachina* (Proc. Biol. Soc. Wash., XXVIII, 1915, p. 21). *Palpalis,* known only in the single type specimen, is smaller and more slender in build than the genotype of *Fabriciella* (*Musca ferox* Panzer); it differs further in having a wider, more prominent front, smaller palpi and bare propleura. These items may appear distinctive if restricted to the above mentioned species, but their value in generic diagnoses becomes evanescent with the discovery of intermediate or connectant forms. The female sex of *palpalis* and most forms characterized herein is not known; until distinctive characters, common to both sexes, are found there appears little need for the multiplication of genera here.

All nearctic species of *Fabriciella,* with the exception of *palpalis,* have the propleura haired or setose. However, the degree of propleural vestiture is subject to considerable variation and sometimes may be reduced to a few small inconspicuous hairs. The distinction between this condition, as exemplified by *intermedia,* and the bare propleura in *palpalis* is hardly a character of generic significance, to say nothing of tribal importance assigned it by Townsend. In fact, it cannot be stated with certainty, from the one available specimen of *palpalis,* that the propleura are normally without any vestiture. A final decision regarding this question must await the accumulation of additional material.

Throughout the genus *Fabriciella* the male genitalia are strikingly uniform in structure suggesting a close relationship of the forms included. The principal differences lie in the male forceps, which have become modified in shape or structure to an extent distinctive for the species. The flat triangular forceps in the European *F. ferox* (genotype) are closely approximated in the nearctic species *F. florum* Walker, (syn. *Larvaevoropsis dakotensis* Townsend; *L. orientalis* Townsend). Those forms closely allied to *palpalis* all have the forceps slightly bowed or arched in profile, the broad flattened hind side has parallel margins, and the apex is broadly rounded about as in *F. lutzi* Curran. The latter, however, is a robust species which, like the genotype, has a narrower less prominent front.

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[1] Contribution No. 672 from Division of Entomology, Texas Agricultural Experiment Station.

Types of the new species described below are in the U. S. National Museum and my collection as specified under the descriptions.

Fabriciella pictilis, n. sp.

Male.—Head subquadrate, frontal profile strongly produced and distinctly longer than facial; cheek almost equal eye height; front broad, at vertex exceeding twice length of second antennal segment and widening gradually downward; sides of front and face including cheeks thinly pollinose on yellow ground color; parafrontals sparsely pale-haired to middle or above and narrowed upper part clothed with erect black hairs; median vitta reddish yellow, slightly widened upwards and exceeding parafrontal width at triangle; inner verticals moderately strong, suberect, outer ones smaller, divaricate; frontals about 12 in the main row, which diverges suddenly outward and only slightly downward from base of antennae, several irregularly spaced bristles outside of main row near middle; ocellars rather long, proclinate; face receding and moderately impressed, epistoma moderately produced; facial ridges bare except two bristly hairs next to vibrissae, which are set about on oral margin; parafacial much wider than clypeus, with an oblique shallow groove extending from near apex of second antennal segment to lower edge of eye, sparsely pale-haired above groove and bare below; antennae black, third segment ovate, hardly twice longer than wide, second segment broad at apex tapering toward base, about as long as third; arista bare, short, thickened nearly to tip, apical segment about three times length of second; proboscis moderately slender, labella small; palpi yellow, slender to tip and not much longer than second antennal segment; eyes rather small, bare; back of head somewhat bulged or convex, gray pollinose, clothed with pale hairs.

Thorax subshining black, scutellum reddish, thinly gray pollinose. Chaetotaxy: acrostichal 3,2 (none immediately behind suture); dorsocentral 3,4 (variable in size); intraalar 3; supraalar 3; postalar 3; humeral 6; posthumeral 3; notopleural 2; presutural 2; sternopleural 2,1; pteropleural 2 (about as large as sternopleurals); scutellum with 4 lateral (basal and subapical pairs small), 1 long decussate apical and 2 pairs on disc set well behind middle; prosternum bare; propleura moderately black-haired; calypters opaque, whitish.

Abdomen subshining reddish yellow, with a broad black median vitta, which expands apically to include all of anal segment except basal margin at sides above, pollen thin or inconspicuous and without definite pattern; first segment without median marginals, second with one stout pair; third segment bearing a marginal row of about 10 and fourth strongly bristled on apical half above; sternites well exposed apically and clothed with long black hairs; genital segments not very large, blackish; forceps moderately arched in profile, rather short and broad, hind side flat becoming concave toward the broadly rounded apex; accessory plate exposed at base, terminating in a strongly bowed acute-tipped process, which is flattened on inner face and beset with minute pale hairs; fifth sternite rather prominent, narrowly divided to middle, lobes broadly emarginate on hind edge, black, clothed with fine to coarse black hairs.

Legs black, strongly bristled; hind tibiae not ciliate, showing an obscure reddish tinge in the ground color; claws and pulvilli hardly equal length of apical tarsal segment.

Wings gray hyaline tinged with yellow basally and on costal margin; first vein bare, third with 4 or 5 small hairs near base; fourth vein with a rectangular stumpless bend; first posterior cell narrowly open far before wing tip; hind cross vein bicurved, strongly oblique to fourth, which it joins hardly one-third the distance from bend to small cross vein; epaulet blackish; costal spine vestigial.

Length: 12 mm.

Holotype: Male, Wildhorse Canyon, Steens Mts., Oregon; 4270–6000 ft; July 5, 1927 (H. A. Scullen); in the U. S. National Museum.

The present specimen, lent for study by the U. S. National Museum, was labeled "*Metopotachina* n. sp.?" by the late Dr. J. M. Aldrich. The color pattern of the abdomen at once distinguishes the species from allied forms having the front similarly produced in the male sex.

Fabriciella orbitalis, n. sp.

Male.—Similar to the preceding species except as follows:

Frontal rows not so sharply divergent at antennal base and descending slightly lower on parafacials; one moderately strong proclinate orbital present; basal segments of antennae reddish yellow, second segment slighty longer than third; sides of front and face more thickly haired. Thorax black, gray pollinose, four narrow dorsal vittae apparent before suture; sternopleural bristles variable, with 3 on one side and 4 on other; posthumeral 2; apical scutellars smaller but well developed; calypters tawny. Abdomen with the median black vitta confined on second segment; fifth sternite wholly reddish, with a wide V-shaped incision extending hardly to middle; genitalia blackish and about as in *pictilis*. Length, 13 mm.

Female.—One specimen provisionally included here differs from male in having the front somewhat less prominent, third antennal segment largely reddish, apical aristal segment less than twice length of second, and abdomen wholly reddish yellow. There are only 3 posterior dorsocentrals (four in male), but this does not appear conclusive in the one specimen, which lacks the anterior intraalar on one side and has the presutural acrostichals very irregularly spaced; sternopleurals 3. Genitalia retracted, apical margin of first segment fringed with inwardly directed or decussate black hairs. Length, 12 mm.

Holotype: Male, Kane Co., Utah, July (C. Lynn Hayward). Paratype: Female, labeled "Colo. July, 1924." Both in my collection.

Fabriciella intermedia, n. sp.

Male.—Differs from *pictilis* mainly as follows: front not so strongly produced, in profile the distance from base of antennae to anterior eye margin barely exceeds eye width; basal antennal segments brownish and pollinose, intermediate one rather thick and slightly infuscated on outer side; apical aristal segment hardly exceeding twice length of second; cheek about five-sixths eye height; parafacial slightly narrowed below but almost equal full width of facial depression. Thorax dusted with lusterless gray pollen, becoming denser on notum, which shows no defined vittae; sternopleural 2,2; scutellum with 2 strong and 1 weak lateral (latter near base), apical pair stout, not very long; propleura practically bare but a few small inconspicuous hairs present. Abdomen wholly reddish yellow with only a trace of black dorsal vitta on second segment, basal margin of latter and following segments with moderately dense changeable whitish pollen; fifth sternite and genital segments reddish; accessory plate and forceps as described but the latter brownish on hind side except near apex and thickly clothed with concolorous pile. Apical tarsal segment reddish beyond middle, about equal length of claws and pulvilli. Hind cross vein reaching fourth nearly two-fifths distance from bend to small cross vein.

Length: 12 mm.

Holotype: Male, "San Jacinto Mts. Calif., F. Grinnell, Jr., J. M. Aldrich Collection," in the U. S. National Museum.

Fabriciella margella, n. sp.

Male.—Similar to the preceding species except as follows: Front more prominent in profile, the distance from base of antennae to anterior margin of eye obviously greater than eye width; second antennal segment slender, rather bright reddish yellow and contrasting sharply in color with dark third segment; proximal aristal segments subequal and apical one hardly one and one-half times longer than second; cheek nearly equal eye height. Thorax black, humeri pale reddish, this color extending backwards on sides of mesonotum to include posterior calli and scutellum; sternopleurals variable (2 on one side, 3 on other); propleura moderately clothed with fine pale hairs. Abdomen wholly reddish yellow, upper surface subshining without any pollen visible except in a flat rear view, which shows a thin whitish bloom on narrow bases of intermediate segments; genitalia as in *intermedia* but the forceps apparently shorter and mostly black-haired behind. Wing with a deeper tinge basally along costa; epaulet red.

Length: 11 mm.

Holotype: Male, Koehler, New Mexico, August 14, (H. F. Wickham), W. R. Walton, Collection, in the U. S. National Museum.

Fabriciella eurekana, n. sp.

A robust shining black species, which traces to *latifrons* or *rostrata* in available keys, but readily distinguished from both by the thicker pilose vestiture of the body; the front and parafacials are wider, more densely clothed with longer black hairs, and there are also differences in the genitalia.

Male.—Frontal width at vertex about one and two-thirds times length of second antennal segment; parafrontals with yellowish gray pollen which becomes thinner near vertex, latter blackish but hardly shining; median vitta dark reddish brown, dusted with gray pollen, wider than parafrontal at triangle; frontals not very stout, row diverging on parafacial with three or four bristles beneath antennal base; verticals two pairs, inner strong and suberect; ocellars long, proclinate; antennae black with a reddish tinge on extreme apex of proximal segments, third nearly as wide as long and broadly rounded apically, second segment rather slender, about one and one-fourth times longer than third; arista bare, black, thickened well beyond middle, basal segments moderately elongate; clypeus and parafacials with satiny yellowish gray pollen, which extends on cheeks including lower half of posterior orbits; parafacials about one-half clypeal width; vibrissae strong, decussate at tips, set well above the prominent oral margin; facial ridges flattened, bristled only on lower extremity; cheek moderately clothed with intermixed pale and black hairs, about two-thirds eye height; eyes bare; proboscis moderately slender, labella smallish; palpi brown at base, slightly thickened beyond middle and paler or reddish yellow, almost equal length of haustellum; back of head with a dense ruff of pale yellowish white pile.

Thorax black, subshining, notum thickly clothed with fine erect black hairs; scutellum reddish, bearing 3 large laterals with 2 or 3 smaller bristles interspaced, apical strong, decussate; sternopleurals 4 to 7; irregular in size and spacing, dorsocentrals 4 behind suture, not very strong; prosternum bare; propleura pilose; calypters opaque; pale yellow.

Abdomen shining black, upper surface evenly clothed with a dense vestiture of soft black hairs, which become longer at sides and on venter; sternites exposed apically and beset with clusters of longer coarser hairs; first segment without median marginals, second with one stout pair (sometimes a weak second pair present); third segment bearing a marginal row of about 12 very stout bristles, anal segment also strongly bristled on apical third above; genital segments black, moderately large; forceps arched in profile, narrow behind with lateral margins about parallel to shortly before apex, thence tapering rather sharply to a pointed carinate beak; process of accessory plate sharp-tipped; fifth sternite black, rather prominent, with a moderately broad but shallow U-shaped apical cleft, lobes thickly black-haired.

Legs black, stout and strongly bristled; claws and pulvilli reddish yellow, nearly equal the combined length of last two tarsal segments.

Wings with a strong yellow tinge near base extending along costal margin to tip of first vein, the remainder gray hyaline; fourth vein with a sharp or angular bend, usually without a stump; third vein setose near base; hind cross vein reaching fourth about two-fifths the distance from bend to small cross vein; first posterior cell narrowly open far before extreme wing tip; epaulet black; costal spine vestigial.

Female.—Frontal width at vertex almost equal the combined length of last two antennal segments; two proclinate orbitals; cheek three-fourths eye height; palpi more distinctly thickened apically; abdomen not so thickly haired on venter; sternites with fewer but stronger bristles; genitalia retracted, apical margin of first segment fringed with closely set inwardly directed black hairs; claws and pulvilli about equal length of last tarsal segment, otherwise similar to male.

Length: Male, 14–16 mm.; female, 16 mm.

Holotype: Male, Eureka, California, May 6, 1935 (E. W. Baker). Allotype, female, same data as holotype. Paratypes: four males and one female, labeled "Calif. June 9," and one female, Nicola, B. C., August 28, 1923 (P. N. Vroom).

Fabriciella egula Reinhard

Fabriciella egula Reinhard, Can. Ent., LXX, 1938, pp. 9–10.

A long series, including both sexes, was taken in Skull Valley, Utah, August 31, 1938, by G. S. Knowlton and L. L. Hanson. The males agree with the type in possessing strong proclinate orbitals and in the genitalia, but show some variations in antennal characters. The third segment is uniformly broad but sometimes distinctly exceeds the length of the second, which is unusual in the present genus. The hitherto unknown female agrees closely with the male except for the usual sexual differences.

A NEW SPECIES OF LUPERODES WITH NOTES ON OTHER COLEOPTERA (CHRYSOMELIDAE, BUPRESTIDAE).

By Burdette E. White, Merced, California.

Luperodes adenostomata n. sp.

Somewhat suggestive of *L. bivittatus* Lec. but is smaller and more strongly polished. The dorsal surface is piceous with a broad, straw yellow vitta on each elytron that does not reach the base or the apex because of a narrow, piceous margin.

Male: Antennae reaching past apical fourth of the elytra, dark with basal segments lighter, 2nd and 3d segments equal and together equal to the 4th in length, terminal segment but little longer than the penultimate and with apical lobe rounded; head entirely dark above the frontal suture, pale brown below including the clypeus and mandibles, surface virtually void of punctures, smooth and shining, clypeus truncate; pronotum transverse, one and one-fourth wider than long, widest at apical third, strongly arcuate to apical angles which are obtuse, lateral margin narrowly visible from above to apical fifth, surface piceous, shining, very feebly punctate; scutellum piceous, impunctate, strongly polished; elytra each with a median yellow vitta entirely bordered by a narrow piceous margin, surface strongly shining, the pale vittae finely alutaceous, entire surface with shallow, obsolete punctures; body beneath dark, basal segment of hind tarsi equal in length to 2nd and 3d together.

Length, 2.8 mm.; width, 1 mm.

Female: Very similar to male but larger, the antennae reaching but little past middle of elytra, with 2nd and 3d segments together a little longer than the 4th. The abdominal segments are also lighter.

Length, 3.5 mm.; width, 1.4 mm.

Holotype, male, and allotype, female, collected at Sunset Valley, Santa Barbara County, California (VII–4–1937), on *Adenostoma fasciculatum* by the writer are in his collection. Numerous paratypes are from the same locality and plant collected July 4, 1937–38–39–40. Other specimens are from Carpinteria, California (VIII–6–1940), on same plant as the above.

Paratypes are deposited in the collection of the California Academy of Sciences, in the Richard Dahl, Wm. Barr, and Kenneth

Hagen collections, and in the collection of Mr. J. J. du Bois.

Although *adenostomata* has been confused with *bivittatus*, it is quite distinct. The size is smaller, the clypeus is not emarginate, there is no submarginal yellow vitta on the elytra, the vittae do not reach the apex, the surface is more shining than in *bivittatus* and the apical antennal segment is not as pointed as in the latter. The two species also feed on different plants. The preferred host of *bivitttatus* is the California Buckeye, *Aesculus californicus*.

Diabrotica balteata LeConte.

Mr. A. C. Davis, 1929 (Pan-Pacific Ent., 5(3): 116), records *Diabrotica balteata* Lec. from San Diego, California. Since there appears to be no later mention of this tropical species in our fauna, the following notes considerably extending its known range may be of interest. One specimen was collected by the writer at Buellton (Northern Santa Barbara County), California, in July, 1937. Numerous examples were also found at Carpinteria, California, during the past three years—mainly in the month of May. Specimens are also at hand from Santa Ana, California (X–2–1938), J. G. Shanafelt, collector.

ADDITIONAL BUPRESTIDAE FROM SUNSET VALLEY, CALIFORNIA.

In a short paper on the *Acmaeodera* from Sunset Valley, California (Pan-Pacific Ent., 15 (2): 69–75), the author listed twenty different species. Since that time he has collected four additional species from the same area. The striking fact is that all twenty-four different forms of this genus were found at the same elevation, within the same floral association, and within a very small area (within a two-mile long and approximately one-hundred-yard wide area along a road cut through the "chamise belt"). The writer is aware of a number of *Acmaeodera* species occurring on Mt. San Jacinto in Southern California, but these are from a series of life zones ranging from Lower Sonoran to the Transition and possibly into the Canadian or Hudsonian zones.

Acmaeodera perlanosa Timberlake.

This species was listed in the above cited paper as *fenyesi* Fall and noted to differ from the typical form. It has since received the above name while the typical *fenyesi* has been collected on *Eriogonum fasciculatum* at the same locality.

Acmaeodera latiflava Fall.

A single typical specimen of this species was collected from blossoms of *Eriodictyon crassifolium* var. *traskiae* on July 4, 1940.

Acmaeodera simulata Van Dyke.

Three specimens were collected from scrub oak, *Quercus dumosa,* July 4, 1939.

Acmaeodera dohrni Horn.

To this name were doubtfully referred several specimens in the above noted paper. Since then, true *dohrni* has been found at the same locality and the former species will be described in the near future by another worker. The *dohrni* were found on July 4, 1939, and were beaten from *Cercocarpus.*

Dystaxia murrayi Lec.

A number of specimens, incuding both sexes, of this desirable species were collected by the writer from *Quercus dumosa* during early July, 1938, –39, and –40. Specimens from this locality were also collected by Dr. E. C. Van Dyke, Mr. Wm. Barr, Kenneth Hagen, and Mont Cazier.

Dystaxia elegans Fall.

One specimen of each sex of this beautiful species was collected together with *D. murrayi.* The male was captured by Mr. Wm. Barr from the valley oak, *Quercus lobata,* in July, 1939. The female was collected by the author from *Quercus dumosa.* The antennae of both sexes are strongly serrate, the male being noticeably more so.

Buprestis laeviventris (Lec.).

A single specimen was collected from the foliage of the Digger Pine by Mr. Wm. Barr, July 4, 1939.

Anthaxia pseudotsugae Chamb.

The writer has collected a few specimens of *pseudotsugae* from the blossoms of *Adenostoma* in early July, 1938 and 39.

Anthaxia aeneogaster L. and G.

This species occurs on various blossoms and has been found during early July.

Chrysobothris mali Horn.

Mali occurs very commonly on *Ceanothus cuneatus* during July.

Chrysobothris arizonicus Chamb.

Specimens of this species (det. by W. S. Fisher) were collected from *Adenostoma fasciculatum* on July 4, 1939, by Mr. Wm. Barr, K. Hagen, and the writer.

Chrysobothris purpurifrons Mots.

One specimen was collected from a freshly felled Digger Pine, July 4, 1939 (det. by J. N. Knull).

Chrysobothris piuta Wick.

This neat little species occurs commonly on *Cercocarpus betuloides* from which numerous specimens were obtained during July of 1937, –38, –39, and –40.

Chrysobothris lucana Horn.

A few specimens of this relatively rare species were collected from *Ceanothus cuneatus,* July 4, 1939.

Agrilus arbuti Fisher.

This species occurs on the Manzanita (*Arctostaphylos* sp.) and was found not commonly in early July, 1939 and –40.

Agrilus politus Say.

Specimens of this well known species were found on a species of willow (*Salix*). They were not common in July.

Agrilus blandus Horn.

One specimen of this rather rare *Agrilus* was caught in flight over *Adenostoma,* July 4, 1938 (det. by J. N. Knull).

Polycesta californica Lec.

One specimen was captured from dead branches of *Ceanothus* by the writer, July 4, 1940. Other specimens were collected by Dr. E. C. Van Dyke, Wm. Barr, and Kenneth Hagen during early July, 1939.

December, 1941, BULLETIN.—The correct date of mailing for this number is November 24, 1941—*not* November 19, as on the cover.

ROBBER FLY AND DRAGON FLY.

By Osmond P. Breland, The University of Texas, Austin, Texas.

On August 7, 1941, at Columbus, Mississippi, the writer was walking through a field when he was attracted by the rather peculiar flight of a dragon fly. The insect was apparently floating effortlessly just above the ground with no wing motion that could be observed, and the speed was considerably slower than the usual flight of a dragon fly. Fortunately the insect came to a rest only a short distance away so that additional observation was possible. Closer examination showed to the writer's amazement, that the dragon fly had indeed not been flying under its own power, but that it had been carried by a much smaller robber fly. Unfortunately the robber fly could not be captured, but the dragonfly, which was dead, was recovered. The writer then procured an insect net, returned to the vicinity, and caught several robber flies. These were all of the same species, and the only species that was observed at this time. The specimen that had caught the dragon fly had been examined closely enough so that the writer feels confident that it was of the same or very closely related species.

The dragon fly (determined by Dr. A. B. Gurney) was *Plathemis lydia* (Drury) ; it had a wing spread of 70 mm., and a length of 43 mm. The collected robber flies (determined by Mr. C. T. Greene) were *Erax interruptus* (Macq.) and averaged 27 mm. in length. This was approximately the same size as the insect that had caught the dragon fly.

The writer has previously observed robber flies with insects larger than themselves, but he had never before seen one with such a large or strongly flying victim. It is of course possible that the dragon fly may have been previously injured which would have made its capture much easier. If not, however, the beginning of this episode of nature would have undoubtedly been much more interesting than its ending.

Change in Name in Diptera.—Mr. A. Earl Pritchard of the University of Minnesota has kindly informed the writers that *Neodioctria* Wilcox and Martin (Ent. Amer. (n.s.) 21 : 7, 1941) is preoccupied by *Neodioctria* Ricardo (Ann. and Mag. Nat. Hist. (9) 1 : 58, 1918). We therefore propose the name **Nannodioctria** in place of *Neodioctria* cited above.—J. Wilcox and C. H. Martin, Alhambra, Calif.

BOOK NOTES.

Introducing Insects, a Book for Beginners, by Dr. J. G. Needham. Pp. i–v + 1–129. (The Jaques Cattell Press, Lancaster, Pa. $1.50.)

Insects and Their Stories, by Harry Hoogstraal. Pp. 5 unnumbered—1–144, with 46 photographs not numbered, and numerous text-figures. (Thomas Y. Crowell Company, New York. $2.00.)

Here we have two books addressed to different types of readers but with the same purpose—to bring to people some acquaintance with the most abundant and most remarkable type of animals in the world today. Such books as these are most necessary because of the important part played by insects in the fortunes of man.

Dr. Needham says in his Preface: "This book is intended for people who want a little information about common insects, presented in language that anyone can understand." He has succeeded in his purpose. The little book has no chapters, but it is broken up into a number of sections, such as Why Study Insects, How to Study Insects; on Butterflies and on Dragonflies, on Grasshoppers and on Crickets, with sections on injurious insects sorted out as to the kind of damage they cause; and numerous others not referred to here. Two closing sections give the elements of insect collecting and rearing, winding up with the index. The illustrations are helpful, but one or two of these "in lighter vein" might have been omitted with dignity.

Mr. Hoogstraal is less formal in his treatment. His book takes in some 46 insects, with fine photographs by Melvin Martinson and drawings by Dr. Carl O. Mohr. There is a short introductory section (the expression used for the divisions of the book) and five others, respectively named Insects of the House, Insects of the Garden, Insects of the Trees and Woods, and Insects in or Near the Water. There is no avowed systematic treatment, but the whole is presented in lively style, quite attractive to the lay reader. This editorial eye has caught one of those curious lapses of the mind. There is a photograph of a male Belostoma, with the eggs glued to its back. On the page opposite it reads: "They (the eggs) . . . usually cover the male abdomen." The author's private Beelzebub (by interpretation, Father of Flies and/or of Lies) obviously got in his fine work at this point! The photographs, at least most of them, are of insects in nature, which is an excellent feature.

These are two fine books for the technical entomologist's library table, to give his lay friends something to Oh! and Ah! about.

Butterflies: A Handbook of the Butterflies of the United States, Complete for the Region North of the Potomac and Ohio Rivers and East of the Dakotas. By Ralph W. Macy and Harold M. Shepherd. Pp. i–viii + 1–247, color plates 1–4, and 70 text-figures, not numbered. (University of Minnesota Press, Minneapolis, Minn. $3.50.)

This work is a systematically arranged and practically complete handbook to the butterflies of the United States, because, as may be noted in the work itself, while it is restricted to a given region, a large proportion of the butterflies of which it treats are to be found also in our West, South, and Southwest. Naturally, especially along our southern border, numerous tropical and subtropical species are found; and in Florida, West Indian forms. In fact, insects as a class are so anti-nationalistic that they respect no artificial boundary lines. They are limited only by climate and food.

The introduction, "About Butterflies" is a general and extended discussion of physiology and anatomy, distribution and faunal zones; with many other curious and interesting facts and data. The body of the book takes up the 162 species it treats of through the families to the species, all with step-by-step keys. Each species is briefly described, as well as its variants; and its distribution is given, in detail for Minnesota as known, together with life-histories. The vernacular name of species follows the scientific with its citations and synonymy. Seventy-four species are figured, 29 in natural color.

While it might seem that so small a book could not adequately cover so large an assemblage of forms, it should be pointed out that its descriptive matter is much condensed, without sacrificing accuracy, thanks to the many keys. And it might also appear that the price is high. But speaking from a limited experience, the enormous labor involved in producing such synoptic work together with the high cost of printing, make the price truly low.

In general comment, this book stands midway between the highly technical and the popular. To the technical specialist, it is another book on butterflies. But to the nonspecialist, to the amateur, it is an indispensable work. J. R. T.-B.

PROCEEDINGS OF THE SOCIETY.

MEETING OF MAY 15, 1941.

A regular meeting of the Brooklyn Entomological Society was held at the Brooklyn Museum on Thursday, May 15, 1941. President William T. Davis called the meeting to order at 8:15 P.M. Nine other members were present, namely, Messrs. Engelhardt, Gaul, Malkin, McElvare, Naumann, Pallister, Shoemaker, Siepmann and Teale; also Mrs. Pallister, Miss Goodman and Messrs. John N. Drake and Jay T. Fox.

The minutes of the previous meeting were read and approved.

Mr. Engelhardt reported favorably as treasurer, and said that sales of the *Glossary* continued, also of the papers by Böving and Craighead, and the Synopsis of the Heteroptera by Torre-Bueno.

Mr. Engelhardt said that he collected three adults of the Buprestid Beetle, *Dicerca scobina* at Woodland, Maryland, March 19, 1941, under the bark of the sourgum, *Nyssa sylvatica.* This species pupates in the fall or early winter and the adults emerge on the first warm days in the spring. It is not collected very often, and seems to be restricted to the sourgum. He also reported collecting the cerambycid beetle, *Centrodera sublineata* at Middletown, Virginia, April 13, 1941, at light. This species is not often collected and is rare in most collections.

Mr. Davis called attention to an article concerning the Schmitt Box appearing in Ward's Natural Science Bulletin, in which credit for the invention of this box is given to a Rev. Jerome Schmitt, of St. Vincent College, Pa. Mr. Davis said that he thought the box had first been made by the father of John B. Smith, a cabinet maker, who still spelled his name Schmitt. Mr. Engelhardt said he was also of this opinion, and Mr. Shoemaker added that he bought three of these boxes from this Mr. Schmitt around 1897 or 1898. A similar box had already been used by Leconte, the coleopterist.

The speaker of the evening was Mr. Rowland R. McElvare, who spoke on the subject of "California Deserts Abloom, Spring 1941."

Mr. McElvare said that he had long awaited an opportunity to see the California deserts in bloom. When it was obvious that this had been a rainy winter in California, he decided that it would be a good time to see the desert, and so it was. Instead of the usual three inches of rainfall, there had been twelve to fifteen and even the Mojave River overflowed its banks.

The California deserts are not a barren waste of sands, but a region of dense vegetation and other natural life, and indeed a busy place. The flowers are unusual not only in their abundance, but even more so in their variety. There are 700 known flowering plants in the Colorado and Mojave deserts.

Mr. McElvare was amazed by the strong winds in the desert. Most of the bushes are circular in form to better withstand the wind, and they give protection and anchorage to smaller plants which grow beneath them. Thus several types of flowers often appear to blossom on a single species of bush.

At Split Mountain Canyon, San Diego County, California, Mr. McElvare collected 18 specimens of the moth *Chlorocleptria jaegeri.* This species was discovered by Grace H. and John L. Sperry, who previously had been the only ones who ever collected it. It is a pale colored desert form, found on the rare Aster *Orcuttii.* On cool days it is sluggish and is sometimes almost enclosed in the flowers.

Mr. Engelhardt pointed out that in his studies of clear-winged moths it could be demonstrated by studies of genitalia, food plants, etc., that the extreme desert forms were conspecific with the normal form. Mr. McElvare said that this was not the case in *jaegeri,* characteristics being present that separate it as a distinct species.

The meeting adjourned at 9:45 P.M.

CARL G. SIEPMANN,
Secretary.

MEETING OF OCTOBER 16, 1941.

A regular meeting of the Brooklyn Entomological Society was held at the Brooklyn Museum on Thursday, October 16, 1941. President William T. Davis presided, and nine other members were present, namely, Messrs. Buchholz, Dietz, Engelhardt, Gaul, McElvare, Nicolay, Sherry, Siepmann and Teale; also Miss Dietz, and Messrs. Frederic Clark and Clarence Stauffer.

The minutes of the previous meeting were read and approved. Mr. Engelhardt reported as treasurer.

Mr. Buchholz reported the death of Frederick Lemmer on September 29 at Orange, N. J. Mr. Lemmer was long an active member of the society, and Mr. Buchholz was authorized to convey the Society's sympathy to Mr. Lemmer's family.

Mr. Engelhardt proposed for membership Mr. Daniel Sherry, 2255 Bedford Avenue, Brooklyn, New York. The by-laws were suspended, and Mr. Sherry was duly elected a member.

Mr. Teale said that he had been to Ward's Natural Science establishment in Rochester during the summer, and discussed the matter of the origination of the Schmitt Box. According to Ward's, the Rev. Jerome Schmitt was the inventor of the box. The Schmitt of Brooklyn, who was a cabinet maker, was his brother, and made the boxes according to the Rev. Schmitt's specifications.

Mr. Engelhardt spoke of the work of Dr. Adam G. Böving, and his contributions to entomology and his services to the Society, and suggested that the Society honor him by making him an Honorary Member. A motion to this effect was made by Mr. Buchholz, was seconded by Mr. Torre-Bueno (by proxy), and unanimously carried.

Mr. Buchholz exhibited specimens of *Enodia creola* and *Enodia portlandia,* both from the Dismal Swamp, Virginia. *Enodia creola* is a night-flying butterfly. It does not fly in the daytime. While night-flying moths are common, a night-flying butterfly is unusual. The commoner day-flying *Enodia portlandia* is very similar to *creola* in general appearance.

Mr. Dietz said that collecting in the Bronx was the poorest season he ever had.

Mr. Nicolay said he collected during the past season with Mr. Quirsfeld in the Great Smokies. It was a dry season, but some Cychrini, Pselaphidae and Scydmaenidae were obtained. It is now necessary to obtain a permit to collect insects in the Great Smokies National Park.

Mr. Teale reported passing through a great cloud of flying ants eight miles or more in width, near Bluffton, Indiana, on July 20. He also said that the eye of the praying mantis is gray or green in color in the daytime, and black at night. No reason for the change in color is known. A similar change takes place in the angular winged katydid. Temperature does not seem to be the cause of the change, as Mr. Teale made experiments along this line.

Mr. Gaul showed living specimens of male black widow spiders of four different instars. The younger ones have white markings, the older ones, red. He said with practice it was possible to tell under which boards one would find black widows. They are usually under a heavy board which is not completely sunk in the ground. At night flying beetles crawl beneath these boards, and get stuck in the spider's web. Mr. Gaul had been bitten by a black widow spider. A local swelling ensued, but no other ill effects.

Mr. Engelhardt said that during May and early June he noted considerable defoliation of the witch hazel along the Bronx River.

This was caused by a comparatively large larva, pale in color, which curled up, when disturbed, like the larva of a sawfly. Three or four of these larvae would be on a leaf. Mr. Engelhardt reared several of these larvae which pupated in August and emerged beginning September 31. The species was a lepidopteron, *Conistra indirecta.*

Mr. Davis exhibited cicadas collected by Dr. Tulloch in Brazil, again illustrating that those species of cicadas living close together look much alike.

The meeting adjourned at 10:15 P.M.

CARL G. SIEPMAN,
Secretary.

MEETING OF NOVEMBER 13, 1941

A regular meeting of the Brooklyn Entomological Society was held at the Brooklyn Museum on Thursday, November 13, 1941. President William T. Davis presided, and seven other members were present, namely, Messrs. Buchholz, Dietz, Engelhardt, Fox, Gaul, McElvare, and Nicolay; also Mr. and Mrs. G. Earle Chace, Mr. and Mrs. Henry Fleming, Jr., Miss Catherine Tilton, Miss Dietz, and Messrs. Frederic V. Clark, A. G. Coyle, and Titus Jessee.

The minutes of the previous meeting were read by Mr. Engelhardt, in the absence of the Secretary, and approved.

As Treasurer, Mr. Engelhardt reported a balance sufficient to meet pending obligations for the year. On behalf of the publication committee, he reported the timely appearance of ENTOMOLOGICA AMERICANA and Number Four of the BULLETIN, the last of the year, now in press, and due for release on schedule, December 1st.

Mr. Engelhardt further submitted a recommendation of this committee to meet the increase in the cost of printing by an increase in the rates of subscriptions on a basis self-sustaining, and, as heretofore, at actual cost. It was moved and carried to increase the subscription rate of the BULLETIN from $2.50 per year to $3.00 to subscribers, and to members, from $1.50 to $2.00, with dues at $2.00, a total of $4.00 per year, to be effective in 1942. The annual subscription rates for ENTOMOLOGICA AMERICANA will continue at $4.00.

The announcement of the deaths of Dr. Hugo Kahl, Carnegie Museum, Pittsburgh, Pa., and of Dr. Ralph Hopping, Chief of the

Agricultural Experiment Station, Vernon, B. C., both subscribers of long standing, were recorded with sincere regret.

Mr. Davis passed for inspection a recent pamphlet of the Staten Island Public Museum, emphasizing places of historical interest.

Mr. Engelhardt exhibited and recommended as delightful reading the book "Sweet Thames Run Softly," by the well-known author, artist and illustrator, Robert Gibbins. The book abounds in charming dissertations on scenery, landmarks, and plant and animal life while idly drifting for weeks on the placid Thames, still affording solitude in war-torn England.

Mr. Teale showed a series of enlarged photographs of Spittle Insects (Family Cercopidae) illustrating the method of secreting their characteristic white froth from glands situated on the posterior part beneath the abdomen.

Dr. Chace told of the organization and the many innovations in an Insectary at the New Zoological Park.

The paper of the evening by Mr. Gaul on "Recent Studies in Social Wasps" well illustrated by lantern slides, will be submitted for publication.

The meeting adjourned at 10:00 P.M.

GEORGE P. ENGELHARDT,
Secretary, pro tem.

Robberfly Attacks Grasshoppers.—The large robberfly, *Promechus nigripes* Hine (Det. S. W. Bromley) was found to be abundant on a Russian-thistle and rabbit-brush covered alluvial fan on the foothills 3 miles southeast of Timpie, Utah (in Tooele County, not far from the Great Salt Lake) on August 5, 1940. These flies were actively attacking and transporting grasshoppers. The most commonly attacked species was *Melanoplus mexicanus* Sauss. with *M. packardii* Scudd., *Hesperotettix viridis* (Thos.), *Trimeritropus caeruleipes* Scudd., and *Trachyrachis kiowa* (Thos.) also taken. One *nigripes* collected had captured and killed a large Stratiomyiidae fly, *Eulalia* (*Odontomyia*) *truquii* Bell (Det. M. T. James).

It was interesting to see these robberflies flying with their grasshopper prey, usually much heavier than themselves. The robberflies proved to be vicious "biters," several times "jabbing" their mouthparts into the fingers of the collectors, sometimes even through the gauze meshes of the insect nets. The "bites" were temporarily painful.—G. F. KNOWLTON AND G. S. STAINS, Utah Agricultural Experiment Station, Logan.

CHANGE IN PRICES OF REPRINTS.

The stringent conditions now prevailing are bringing with them increases in costs of everything. Our BULLETIN is not exempt. In view of the change in the cost to us of reprints, we are forced to revise our prices for these to authors, beyond the gratis 25, which we are continuing until further notice. These alterations in prices make but little change in our price list of February, 1934 (BULLETIN, vol. XXIX, p. 24). We repeat hereafter our conditions for reprints as there set forth; the prices given, however, are the new ones. These prices for reprints are in effect for *all* reprints, from those for this issue on.

Reprints will be furnished authors *only on specific request.*

No free reprints will be allowed of articles less than one full page in length.

Reprints of articles less than one full page in length will be furnished—*not less than 25 copies*—at cost, plus 10 per cent, plus postage.

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75 additional reprints: 1–2 pages, $3.75; 3–4 pages, $4.50; 5–8 pages, $6.; 9–12 pages, $6.75; 13–16 pages, $9.; 17–20 pages, $11.

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It is suggested to authors *THAT NO GRATIS REPRINTS BE REQUESTED,* unless the importance of their papers calls for them. Free reprints represent a considerable cash loss to our publication.

Every one of the conditions preceding will be *strictly* carried out, with NO exceptions. We are sorry, but we are under compulsion.

THE PUBLICATION COMMITTEE OF THE
BROOKLYN ENTOMOLOGICAL SOCIETY.

EXCHANGES

This one page is intended only for wants and exchanges, not for advertisements of articles for sale. Notices not exceeding THREE lines free to subscribers. Over lines charged for at 15 cents per line per insertion.

Old notices will be discontinued as space for new ones is needed.

DIURNAL LEPIDOPTERA.—Have many desirable western species to exchange, including *Argynnis atossa, macaria, mormonia, malcolmi, nokomis; Melitaea neumoegeni; Lycaena speciosa;* etc. Send lists. Dr. John A. Comstock, Los Angeles Museum, Exposition Park, Los Angeles, Calif.

BUY OR EXCHANGE: Pinned Microlepidoptera and papered Pieridae of North America. Full data with all specimens. Named material of all groups offered. Alexander B. Klots, College of the City of New York, New York City.

PENTATOMIDAE: Want to buy or exchange Petatomidae from the United States and Mexico. Herbert Ruckes, College of the City of New York, 17 Lexington Ave. N.Y.C.

ACALYPTRATE DIPTERA OF THE WORLD wanted for determination or in exchange for other insects. Geo. Steyskal, 23341 Puritan Ave., Detroit, Mich.

LEPIDOPTERA COLLECTION.—Excellent condition, fine representation of named N. A. Diurnals and Nocturnals. Also choice selections of tropical Papilios, Sphingiids and Saturniids. Hy. J. Dietz, 3053 Hull Ave., New York, N. Y.

WANTED.—Living colonies of Vespine wasps. Buy or exchange in other orders. A. T. Gaul, 401 Washington Ave., Brooklyn, N. Y.

WANTED.—MANTID EGG CASES from West of the Mississippi River. If interested in collecting, write: Osmond P. Breland, The University of Texas, Austin, Texas.

INTERESTED IN AEGERIIDAE: would like to buy or exchange for these. Also interested in beetles, moths and butterflies of the world. R. E. Griffin, 4514 S.E. 18th Ave., Portland, Oreg.

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OF THE
BROOKLYN ENTOMOLOGICAL SOCIETY

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JUL 3 1942
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ALBRO T. GAUL GEO. P. ENGELHARDT

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The Brooklyn Entomological Society

Meetings are held on the second Thursday after the first Tuesday of each month from October to June, inclusive, at the Central Museum, Eastern Parkway and Washington Ave., Brooklyn. The annual dues are $2.00.

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311 East 4th St., Tucson, Ariz.

BULLETIN

OF THE

BROOKLYN ENTOMOLOGICAL SOCIETY

Vol. XXXVII April, 1942 No. 2

GEORGE PAUL ENGELHARDT

George Engelhardt is gone from us! He is now in the eternal peace that awaits us all!

We shall all miss the kind, true friend, who always found time to help everyone.

After a short illness, George P. Engelhardt passed away on May 24, 1942. His friends, and they are all who knew him, deeply share in the sorrow of his family.

J. R. de la Torre-Bueno
Tucson, Ariz.

THE GENERA OF THE SYSTEMA GLOSSATORUM OF FABRICIUS (LEPIDOPTERA).

By W. P. Comstock, New York, N. Y.

The *Systema Glossatorum* of Fabricius is known from three incomplete copies; two in Germany in Stettin and Berlin, consisting each of seven signatures, 112 pages; and one consisting of five signatures, 80 pages, in the library of The American Museum of Natural History. The facsimile edition by Felix Bryk (J. Chr. Fabricius, Systema Glossatorum, Neubrandenburg, 1938) makes the extant portion generally available, pages (1)–XII, 13–112. Bryk also reproduced the review of the Systema Glossatorum which appeared in the Magazin für Insektenkunde (Illiger, K., 1807: **6**, 277–289). It is from this review by Illiger that the Fabrician genera have been known and dated heretofore, the references appearing for example, as from Kirby (1871), *Vanessa* "Fabr. Ill. Mag. VI. p. 281 (1807)."

The dating of the work is established as before the publication of a review in the Allegemeine Literatur-Zeitung, Halle, [Jena], 19th of December 1807: columns, 1177–1181. A number of the genera erected by Fabricius in the Systema Glossatorum are mentioned in this review. Therefore the Fabrician text with the title page date of 1807 must have existed sometime before the 19th of December 1807.

In the Systema Glossatorum, on pages IX–XII, Fabricius lists under "Characteres Generum" 49 genera separated into six divisions based on differences in the antennae and individually segregated by differences in the palpi. No species are cited. The original references to the Fabrician genera are to be found in these pages and not in Illiger's Magazine; i.e., *Vanessa* Fabricius (Systema Glossatorum, 1807: p. IX, No. 13).

Illiger, in his review, is the first revisor and as such his actions affect some of the first eleven genera given in full by Fabricius, pages 13–112. Here Illiger, by mentioning a single species, indicates the genotype of *Amathusia* as *Papilio phidippus,* Linnaeus, 1763 and the genotype of *Zelima* as *Papilio pylades* Fabricius, 1793.

As to the continuation of the Systema Glossatorum beyond page 112, there is lack of evidence of its complete contents for there is no copy in existence so far as is known. However there is partial evidence of the contents of the remainder of the work from Illiger's review for Illiger must have had before him the balance of the Fabrician text in some form, possibly a manuscript, which gives

JUL 2 1942.

us our knowledge of some of the species contained in the remaining 38 Fabrician genera. There is evidence that such a manuscript survived for Hoffmannsegg mentions having the text in manuscript and he also mentions Illiger's review (in Wiedemann, Zool. Mag., Kiel, 1817–1818: 1, (1), 54–55; 1, (2), 95). The validity of these Fabrician generic names must depend upon their definition on pages IX–XII of the Systema Glossatorum. Illiger alone is responsible today for the citation of some of the species included in genus 12, *Vanessa* (in part), and the remaining genera.

Bearing in mind the desirability of stability and uniformity in the use of generic names, it is necessary to weigh carefully any suggested solution of the problem intended to secure this end. Two methods are presented and the merits and demerits of each will be weighed.

I. The Systema Glossatorum is accepted as published 1807.
    a. Fabricius is the author of 49 genera, defined without citation of species, pages IX–XII.
        1. The genotypes must be chosen from names of species listed by Fabricius, pages 13–112, for the first 12 genera.
        2. The genotypes must be chosen from names of species listed by Illiger, as first revisor, for the last 37 genera.
II. The Systema Glossatorum is considered unpublished until the issue of the Bryk facsimile 1938.
    a. Illiger is the author of 49 genera, defined with citation of species in Illiger's Magazine, 1807, pages 279–289.
        1. The genotypes must all be chosen from names of species listed by Illiger.

Proposition I has the following advantages. Starting with the work of Latreille (1810) these genera have been used and credited to Fabricius. Genotypes have been properly fixed for most of these genera by Latreille, Curtis, Westwood, Crotch, Scudder, Butler and others, being selected from species included by Illiger. Hemming (The Generic Names of the Holarctic Butterflies, 1938) considers 25 of these genera as valid for Holarctic butterflies and says (p. 63): "The only possible course (if Fabricius' ill-defined genera are to be accepted as they certainly must) is to assume that Fabricius correctly identified each of the species that he mentioned." The genera are defined even if "ill-defined." For the proper validation of *Euploea, Vanessa, Argynnis, Colias* and *Nymphidium,* Hemming (1934) has applied for opinions from the International Commission on Zoological Nomenclature. His recommendations do not appear to have been acted upon as yet.

Proposition I has the following disadvantages. The selection of the genotype for the genus *Vanessa* is restricted to the seven species names given by Fabricius on pages 110–112, the known portion of his work terminating in the midst of his consideration of this genus. The name *atalanta* is not among these seven species so that the selection of *atalanta* by Latreille (1810) as the genotype of *Vanessa* is invalid. Further there is no species listed by Fabricius which is congeneric with *atalanta.* Another conception of the genus *Vanessa* is forced upon us unless the name is placed upon the nomina conservanda list. Furthermore, the citations of reference for the Fabrician genera must all be changed henceforth from Illiger's Magazine to the Systema Glossatorum.

Proposition II has no advantage over proposition I except that the genus *Vanessa* may be validated in its now accepted usage with *atalanta* as the genotype. But it would be *Vanessa* Illiger (nec Fabricius).

Proposition II has the considerable disadvantage in that the Fabrician authorship of all of these genera is denied; their authorship passes to Illiger. Such a change would result in much confusion in literature and would be contrary to the accepted priority of Fabricius and the understanding of entomologists since 1807.

It is definitely established that 112 pages of the Systema Glossatorum were printed in press forms intended for binding in a printed book. These pages were not proof sheets. It is known that at least three such printed copies passed from the possession of the author and/or publisher, voluntarily or involuntarily, into the possession of others, thus accomplishing publication in fact. There is a presumption of regularity.

A contrary opinion has been given (Griffin, Francis J., The Systema Glossatorum of Fabricius, Jour. Soc. Bib. Nat. Hist., London, 1939: 261–267).

Griffin reviews the references in literature to the Systema Glossatorum from its printing in 1807 to 1938. This mass of evidence establishes the fact that there was a wide knowledge of the contents of this Fabrician text but almost entirely through Illiger's review. Furthermore the authorship of Fabricius was never in question. Zinken (Beitrag zur Insecten-Fauna von Java I, 1831) mentions having the seven printed signatures, possibly one of the existing copies. Hoffmannsegg (1817–1818) had the text in manuscript and was also acquainted with Illiger's review. The reasons for the probable destruction of most of the printed sheets are given.

The data given by Griffin are valuable but in my opinion the conclusion he draws from them is wrong when he says:

"It is my opinion, therefore, that there is no evidence of any sort that the book *Systema Glossatorum* of Fabricius was published in 1807. I am convinced that it was not published in any form other than the extract by Illiger and the translation of this by Children, both incidentally issued anonymously, [Children (Phil. Mag. Ann. 7, 1830: 118–124) signed his article on page 124] until 1938, when the publication of the facsimile of the 7 sheets first made the work a 'published' work in the meaning understood in Entomology, and therefore not available for quotation as a publication until 1938."

In conclusion, it is my opinion that there is sufficient evidence to establish the date of publication of the Systema Glossatorum as of 1807 and the references to the genera therein should be cited from it as of the date 1807, with Fabricius as the author.

THE DESCRIBERS OF INSECT SPECIES

I am very desirous of obtaining from all entomologists who have described one or more *new species* of insects a statement of the *total number* described to this date. Where more than a single order of insects is involved, an indication of the total for each order would be appreciated. If there are known synonyms among such species, the number of valid species or subspecies should be given. It is hoped that the response to this appeal will be such that a summary of the subject may be presented in the not distant future. A most favorable response from entomologists has been received and further coöperation will be greatly appreciated. In the cases of deceased entomologists, where figures of described species have already been published, many such data are available to me, but further references, especially in obscure journals, would be much appreciated. I wish at this time to express my very deep thanks to the many entomologists who have so kindly coöperated in this attempt to determine more accurately the total number of described insect species. Address all communications to

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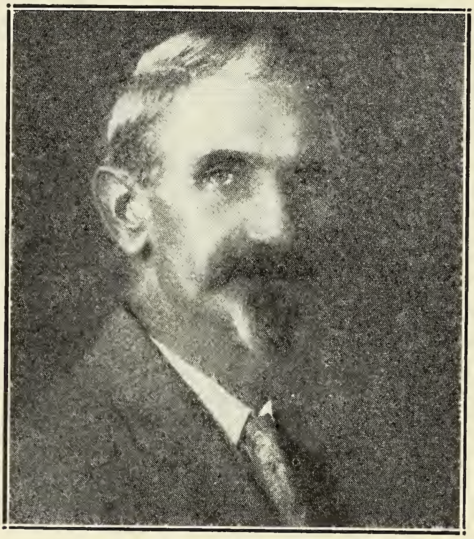

DR. H. P. LÖDING, OF MOBILE, ALA.

1869–1942.

Although not a member, H. P. Löding has been a long-time subscriber to our publications and a friend of our Society.

Warm-hearted, generous and with a keen sense of humor, his was an endearing personality. In his home town he was universally known and highly respected as a citizen of integrity, always to be depended upon to serve unselfishly in constructive activities for the welfare of the community. In Mobile all doors were open to visitors privileged to refer to H. P. Löding as a friend. This often has been the writer's pleasant experience.

Of Danish origin and schooling, Dr. Löding spent years of his early manhood in South and Central America before establishing himself permanently as a florist and horticulturist in Mobile. Successful and content in making a comfortable living, he had no ambition for wealth. Greater happiness he found in his life-long devotion to nature study. Few men, amateur or professional, are as well-informed in this subject as was he. His scientific contributions in the fields of botany, herpetology and, in particular, entomology are numerous and important.

H. P. Löding is best known as a collector of Coleoptera. In this Order of insects his very large collection in general is representative of North America, and as regards the beetle fauna of the South is unsurpassed and unique. To exacting students it has been and will be fundamental and indispensable. Wisely Mr. Löding has made provision to assure the upkeep and availability of his collection under the supervision of the Museum of the University of Alabama. For this generous, outstanding donation, as well as for other valued cooperation, the University has acknowledged its appreciation by conferring on H. P. Löding the honorary degree of Doctor. We gratefully endorse so fitting a recognition. The collection is a monument to the untiring effort of an expert and enthusiast to whom we pay this tribute as one of the dearest of souls and a true friend.

George P. Engelhardt,
Scarsdale, N. Y.

THE MALPIGHIAN TUBULES OF AEDES AEGYPTI L. (DIPTERA, CULICIDAE).

By George S. Tulloch and Morris Goldman, Department of Biology, Brooklyn College.

This paper reports observations dealing with (1) the gross structure of the Malpighian tubules of *A. aegypti* in all instars during development and (2) the histological structure of the tubules of the fourth larval instar.

Method.

The gut and attached tubules were dissected from the body in a physiological saline medium and examined in the living condition or fixed for further study as whole mounts or sections. Whole mounts were prepared by using Buxton's medium or by fixing in osmic acid vapor followed by staining in methyl green. Material to be sectioned was fixed in Carnoy's or Bouin's fluid and stained with iron haematoxylin or Mallory's triple stain. Golgi bodies were demonstrated by fixing the tubules in 3% potassium dichromate and 1% osmic acid (3:1) followed by treatment in 3.5% potassium dichromate (2–5 days) and 1% silver nitrate (1–2 days). All sections were cut at 6 micra. The basement membrane was demonstrated by using 0.01 normal sodium hydroxide.[1]

Observations.

There are five Malpighian tubules which arise just anterior to the constriction between the stomach and intestine. Four of these arise laterally, two on each side, while the fifth arises dorsally. The arrangement of the tubules around the posterior stomach region is such that the distance between the two more ventral tubules is about twice that of the distance between any two of the others. Each tubule extends anteriorly to the mid-stomach region, then turns sharply and extends posteriorly to the rectum. Some crossing of the tubules occurs in their posterior course. The blind ends of the tubules are attached to each other and to the rectum by means of tracheoles; elsewhere along their course the tubules are similarly attached to each other but are free of any connection to the gut or body wall.

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[1] Wigglesworth, V. B. 1939. The principles of insect physiology. E. P. Dutton and Co., New York. Contains excellent bibliography.

In freshly dissected tissue the tubules are white, translucent structures consisting of large cells set upon a transparent basement membrane. The nuclei of these cells are visible as clear areas within the cytoplasm. The outer limits of the cells can be readily observed through the basement membrane. In the first three larval instars the inner limits of the cells may be observed along the lumen of the tubules as a layer with a different refractive index. In the fourth larval instar and in the pupa and the adult the inner limits of the cells can be observed only in the proximal regions of the tubules. Most of the cells of the tubules are triangular with their apices projecting into the lumen giving to it a tortuous appearance. For a short distance close to the entrance of the tubule into the gut the cells are of the flattened cuboidal type and the lumen appears as a straight tube.

In all instars except the first the tubules increase in size distally, the diameter of the blind end being about two times greater than that at the point of origin. This increase in tubule size is accomplished by an increase in cell size rather than in cell number. During development the tubules increase rapidly in size from one larval instar to the next, those of the mature larva being approximately eight times longer than those of the first instar larva. The tubules of the pupa and adult are slightly smaller than those of the mature larva. The variations in tubule size from proximal (minimum) to distal (maximum) ends and from one instar to another are indicated (Table 1).

TABLE 1. Size of the Malpighian tubules of *Aedes aegypti* L. (all measurements in millimeters).

	Larval instars				Pupa	Adult
	1	2	3	4		
Diameter:						
Minimum	0.017	0.017	0.035	0.072	0.064	0.060
Maximum ...	0.017	0.027	0.084	0.126	0.098	0.120
Length	0.400	1.296	2.250	3.300	3.000	3.000

In order to ascertain the comparative size of the tubules of *A. aegypti* with other mosquitoes the mature larvae of seven other genera were examined. It was found that the tubules of *A. aegypti* were larger than those of *Psorophora jamaicensis, Megarhinus portoricensis, Anopheles punctipennis, Culex quinquefasciatus, Uranotaenia sapphirina, Wyeomyia mitchelli* and *Mansonia perturbans.*

Whole mounts treated with osmic acid vapor and methyl green reveal the more darkly staining modified "internal border" which lines the portions of the cells facing the lumen of the tubules. Under this treatment also the nuclei are vesicular with large irregular dark staining central areas, and crystals resembling those of uric acid are numerous throughout the cytoplasm of the cells, especially in the distal portions of the tubules.

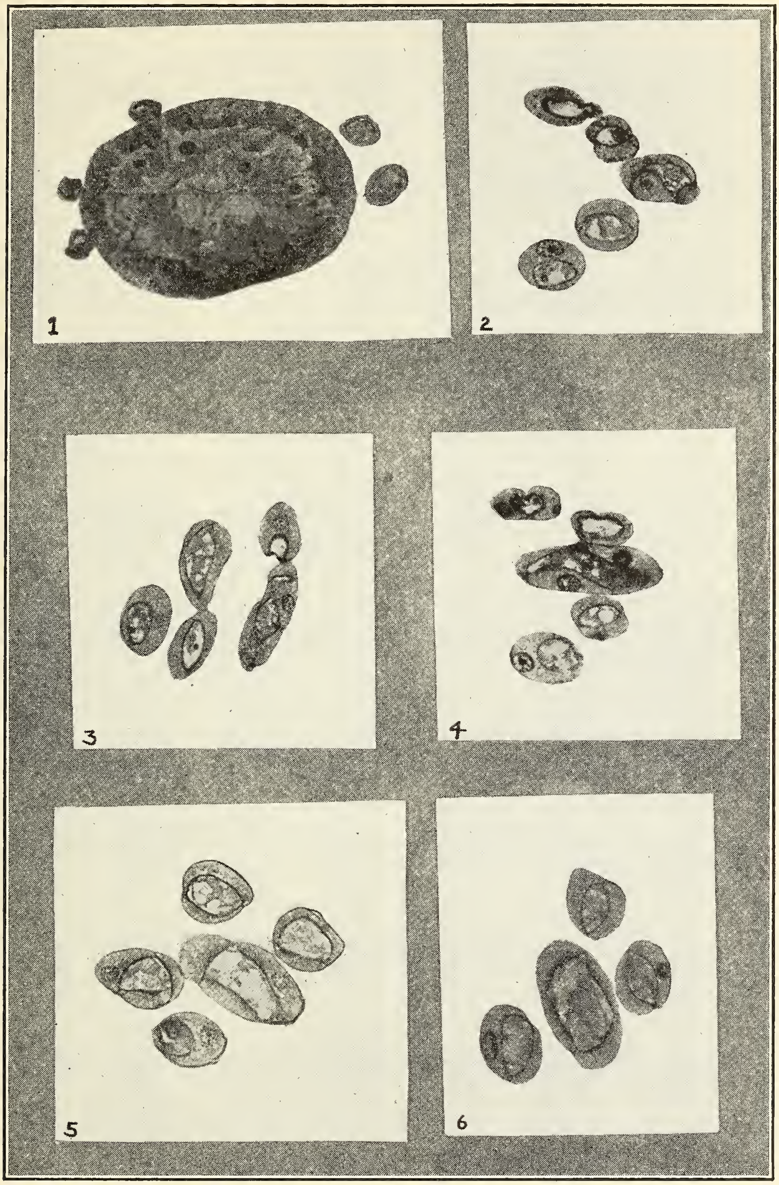
Sections of the fourth larval instar are useful in demonstrating clearly many of the features indicated in the living material and in the whole mounts. Sections made through the proximal regions of the tubules demonstrate their arrangement at their points of origin around the gut. Likewise, the flattened nature of the cells, the regular contour of the lumen and the lesser diameter of the tubule are apparent (Fig. 1). In the distal regions true cross sections show all gradations between a single cell entirely enveloping the lumen (Fig. 4) to two crescents joined at their tips (Fig. 2). Oblique sections may show portions of as many as four cells making up a tubule (Fig. 6). Such sections also demonstrate the tortuous course of the lumen caused by the bulging of the cells in their nuclear regions (Figs. 2, 4). Scattered throughout the cytoplasm of the cells are crystals resembling those of uric acid. These stain black with iron haematoxylin (Fig. 2) and exhibit spoke-like radiations from their centers. Golgi bodies appearing as small refractile spheres are found throughout the cytoplasm. A differentiated internal border which stains black with iron haematoxylin and blue with Mallory's triple stain is apparent throughout the entire lumen of the tubules (Figs. 1–6). This border appears to be a part of and a modification of the cytoplasm bordering the lumen. Occasionally, however, when adjacent cells are spread apart this internal border appears to be continuous. Under high magnifications this border appears irregularly striated.

The nuclei of these cells are large and vesicular and are characterized by a large irregular central body from which other chromatic material radiates in all planes (Fig. 2). In these respects the nuclei of the tubule cells are similar to those of the stomach (Fig. 1).

SUMMARY.

1. The five Malpighian tubules of *Aedes aegypti* L. arise anterior to the constriction between the stomach and intestine; four of these tubules arise laterally, two on each side and the fifth arises dorsally.

2. The portions of the cells of the tubules adjacent to the lumen


1
2
3
4
5
6

are modified to form an internal border.

3. Golgi bodies and uric acid crystals are present in the cytoplasm of the cells.

Explanation of Figures.

(All sections × 125)

Figure 1. Section through posterior region of stomach showing arrangement of tubules.

Figure 2. Sections through tubules showing uric acid crystals within cytoplasm. Section to right demonstrates nuclear bulge (oblique section).

Figure 3. Sections of tubules in oblique and transverse planes. One section (upper left) demonstrates a tracheole in sagittal section.

Figure 4. Sections of tubules in oblique and transverse planes. One section (lower left) demonstrates continuity of internal border across gap at cell junction.

Figure 5. Sections of tubules in oblique and transverse planes. One section (upper right) demonstrates basement membrane loosened from tubule.

Figure 6. Sections of tubules in oblique and transverse planes. One section (center) shows four cells (oblique section).

ADDITIONS TO VESPINE BIOLOGY. I. NOTES ON MATING AND BROOD REARING.

By Albro T. Gaul, Brooklyn, N. Y.

The experiments and observations recorded in this paper were all made in Brooklyn, N. Y., during the summer of 1941. The hornets were all collected out of town (1), and were transported with the nests in screen covered cans.

The maintenance of the colonies in the city involved more care than the method of housing in window hives, previously described (2). The wasps had to be prevented from trespassing in neighboring homes and giving grievous cause for complaint. Also, they had to have a degree of freedom for normal exercise and for feeding. They had to be available for observation at all times.

A cage was constructed in the backyard. It enclosed a space of 128 cubic feet and was built of 1/8 mesh wire screening. One end of the cage comprised a 2 by 2 foot screen door for access, and a set of three hives similar to the window hives previously mentioned. The hives were movable and could be taken into the laboratory. The captured nests were placed in these hives. Grass and wild plants were grown in the cage.

The size of the cage permitted limited flight on the part of the hornets and it afforded an opportunity for the control of feeding.

The depredations of the ant, *Monomorium pharaonis* Lin., caused a considerable brood mortality. Otherwise the colonies fared rather well in confinement.

The hornets were fed by placing melon rinds, honey, sugar, suet and meat scraps in the cage. A supply of tap water was available to the wasps in a shallow pan of wet sand.

Mating.

On August 4, 1941, at 2:55 p.m. (E.D.S.T.) mating was first observed on *Dolichovespula arenaria* Fab. This is probably the first record of any observed Vespine mating. It is of extreme interest that the male and the queen were both from the same colony, there was only one nest of this species in the cage. The mating may best be described chronologically:

2:55 p.m.—Male and queen discovered during nuptial antics. Queen is walking about in the cage. Male is standing, fore legs holding queen's tegulae, mid legs holding her wings and hind legs grasping her fourth abdominal tergite. Antennae of male are briskly stroking queen's pronotum and antennae. Male genitalia are ejected.

3:01 P.M.—Queen walks into a group of males resting on the screening. Males interfere, whereupon queen's mate leaves her to chase intruders. He immediately returns to his original position with his queen.

3:25 P.M.—Queen has been walking about with the male all this time. Male now changes his position: he drops back until his head is in line with the queen's first abdominal segment, forelegs clutching her wings, mid legs holding her hind femora and hind legs grasping her hind tibiae. Now the queen cannot walk, her mid and hind tarsi twitch nervously. Her antennae are quiet.

3:32 P.M.—The pair are still motionless and unmated. Male is flexing his claspers.

3:36 P.M.—Male extends abdomen and grasps tip of queen's adbomen with his claspers. His abdomen is flexed to the right about 20 degrees. The male genitalia are thrust toward the queen's abdomen from the right side. The apparent copulation lasts but a few moments.

3:40 P.M.—Genitalia are no longer in contact. The male telescopes his abdomen from time to time. Queen is quiet.

3:55 P.M.—The male taps the cage with his genitalia.

3:57 P.M.—Male resumes position first described at 2:55 P.M. Queen again walks about with her mate.

6:20 P.M.—Male and queen part company for the first time since 3:01 P.M. After walking alone for a few paces the male returns to the queen. His genitalia are still extruded.

7:13 P.M.—Male has been walking about and returns to the queen only occasionally. The queen now objects to his advances.

7:45 A.M. (Aug. 5, 1941)—Male (who was marked at 7:13 P.M., Aug. 4.) is now lying dead in the cage. Queen (who was also marked) is alive and active. Control males, who did not mate, are also active.

That the mating was probably successful was indicated by the contact of the genitalia and by the subsequent death of the male, although his genitalia were still intact.

It must be kept in mind that the conditions were atypical, and that the cage prevented a true nuptial flight. The fact that the male grasped the queen's wings and thus prevented a flight attempt, may be explained on the grounds that during a true nuptial flight he would overtake her in the air, that her wings would already be in motion and consequently that he could not grasp them. It is highly improbable that Vespine mating could go so long unrecorded if it took place on or near the ground. The encounter with the other males is also an abnormal contingency.

It must be remarked that no other wasps were observed in an attempted mating.

Rau (3) has suspected that males and females of *Polistes* from the same nest will mate. Here, however, is a definite record of an attempted mating, and possibly a successful mating, of two Vespines from the same nest.

Egg Deposition.

It has been previously reported (4) that the queen hornet places one egg in each cell, and attached to that angle of the hexagon which is nearest the center of the comb. The author has never observed any deviation from this habit.

The workers on the other hand lay their eggs at any position in the cell (5). Often as many as six or eight eggs may be placed in one cell by the workers. This leads to the general appearance of confusion and disorganized oviposition instincts on the part of the workers.

It must be recalled that whereas one queen lays eggs, many workers can lay eggs. A careful worker egg count in a number of combs of several species reveals a very definite pattern of worker egg deposition. Notes were taken on the relative position, depth in the cell, and approximate age of each worker egg in nests of *Vespula maculifrons* Buysson, *Dolichovespula maculata* Lin. and *D. arenaria* Fabricius. Many adjacent cells in a comb have an egg of the same age, at the same relative position and at the same depth. Series of cells have the same worker egg pattern. This consistent phenomenon seems to overrule the laws of chance and probability.

Since the worker is a female, we cannot expect her to have instincts at great variance with the queen, the normal female. We could hardly expect a worker to deposit more than one egg in each cell of a comb. We should certainly expect the worker to develop a habit of oviposition, as the queen has developed her particular habit.

The author's explanation for the worker egg pattern is in complete agreement with what we might expect, as well as with the direct evidence: A number of egg laying workers oviposit in a comb. Each worker places one egg in a cell. Each worker has her own habit of egg orientation in the cells.

The queen probably develops her habit of laying eggs at the inner angle of each cell, as that position will give the eggs most protection, and she in turn will be well balanced on a small comb when she oviposits in that way. The workers, however, do not ovipost until the comb is fully developed, the colony stands a good chance for survival, the protection of their eggs is not essential and their position on the large comb is of little consequence; therefore they may oviposit in any way that they desire.

BROOD REARING.

It is interesting that the nurse workers will feed as many larvae in a cell as they can reach. One cell for instance, may have two second instar larvae and one third instar larva, all developed from workers eggs. This alone is ample proof that many larve may be fed in each cell.

Eventually, only one larva can survive in a cell; the surviving larva consuming his less fortunate brothers. The factors governing the survival of a larva are his depth in a cell and his age. The deeper larvae have a positional advantage when it comes to devouring their companions. The older larvae have the advantage of strength and firmer mandiles. Actually, the worker egg survey reveals that the deeper larvae are also the older; this may be a mechanical necessity of the function of oviposition in a cell.

What then, is the function of the younger and shallower placed larvae? When the workers lay eggs, the entire colony is on the decline. Workers may desert it at any time. If the deeper male larva has a supply of fat brothers in the same cell with him, his chances of ultimate survival are superior to a lone larva of the same age. The high male larva population in each cell at the end of the season may be a method of storing the cell with food for the one surviving larva, a deviation from a normal instinct among the solitary wasps.

Polistes wasps in our Northeastern states store a drop of nectar with each egg in a cell. Vespine wasps make no such provision for their young; they feed the larvae directly from the time of hatching.

SUMMARY.

It has been found possible to maintain Vespine wasp colonies in complete captivity in cages. A successful mating has probably been observed between a male and a female from the same nest. Workers oviposit according to their individual habits, and many oviposit in the same cell. Workers will feed a number of larvae in the same cell. The survival of a larva in a cell containing many larvae depends upon position and age.

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5. **Duncan, C. D.** Ibid., pp. 161.

New Record for Notonecta borealis Bueno and Hussey:—This species was taken by Owen Bryant at Ft. Wrigley, N.W.T., on September 26, 1929. Ft. Wrigley is on the Mackenzie River, and represents the farthest north record of this species which has been reported from British Columbia and Quebec in Canada, and from Michigan, Minnesota, and Colorado in the United States.

H. B. HUNGERFORD
Lawrence, Kans.

NOTES ON THE GENUS DOLICHOPUS (DIPTERA, DOLICHOPODIDAE).

PAPER 2.[1]

By George Steyskal, Detroit, Michigan.

In the first note of the series I presented epigamic observations on *Dolichopus omnivagus* V. D. Since Aldrich (Van Duzee, Cole and Aldrich, 1921) brought together the then known facts relating to the courtship of *Dolichopus* species, including the five species *D. tenuipes* Ald., *D. crenatus* O. S., *D. plumipes* Scop., *D. aldrichii* Wheeler and *D. longimanus* Lw., the only additional observations of which I am aware were recorded by Gruhl (1924), who included notes on *D. ungulatus* L., *D. pennatus* Mg., *D. plumipes* Scop. and *D. popularis* Wd. I am able at this time to add *D. eudactylus* Lw., *D. ovatus* Lw., *D. setifer* Lw., *D. albicoxa* Ald., *D. gratus* Lw. and *D. latipes* Lw.

Little physical description is given here inasmuch as full descriptions of the American species are easily available in Van Duzee, Cole and Aldrich (1921).

D. eudactylus Lw. On June 5, 1938, I was able to observe this species on leaves of underbrush in the wood back of my house in Detroit, Michigan. The majority of the flies were males, each occupying a sunny spot on the leaves, once in a while moving to a different spot. If that spot were already occupied by another male the intruder would frequently assume the attitude described below, but more frequently would be chased away after a brief aerial skirmish.

The male of *eudactylus* faced very closely the object (male or female) of his attentions and quickly assumed a reared-up posture on his two hind pairs of legs with his hypopygium almost touching the leaf on which he was standing. The hypopygium was lowered away from the abdomen somewhat and the wings were held at approximately a 30° angle to each side of the abdomen, twisted so that their lower edges were turned a little forward. The fore legs were held extended widely laterally with the tarsi curved forward a little. The fly held this position for a very short time and then attempted to mount the other fly from the rear. No successful attempts at mounting were observed.

On June 4, 1939, the above observations were confirmed and an apparently successful union was watched. The union continued for thirty seconds, during which time the female made a few weak attempts to disengage herself. The pair was finally separated by the persistent attentions of a second male and all three flies flew away.

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[1] For Paper 1 see this Bulletin, vol. 33, pp. 193–194 (1938).

Eudactylus was again observed in the same locality on June 8, 1941. The flies, abundant enough, seemed to be only males. There was little epigamic exhibition, the flies usually sitting calmly on a leaf. They would, however, occasionally fly about. If one alighted near another the epigamic display was exhibited with some difference from that described above. The fore legs were stretched very widely apart and the fly took a very close position, less than his own length from the other fly. The protagonist would quickly jump upon the second fly and the result was that the second fly would be driven off. Sometimes a fly would go about "knocking off" three or four other flies in succession. The display in this case seemed to be one of threat only.

By June 30, 1941, *eudactylus* was decidedly less numerous and on August 17 there was none to be found.

D. ovatus Lw. was watched on October 12, 1940, on small "mud flats" on the banks of the River Rouge near my home in Detroit. In midsummer other species predominated, but on October 12 there were many *ovatus* on the clayey banks of the river enjoying the warm sunny afternoon on fallen leaves lying on or very near the water. The only other *Dolichopus* taken at the time was a single male *albiciliatus* Lw. The *ovatus* were never long in one spot, stopping only to preen themselves or to "nose" about in the substratum. When one male approached within an inch or so of another there would be a brief tumbling flight, one of the flies usually alighting in the same spot whence the fracas started. Females apparently did not resent the close approach of others of the same sex.

Occasionally a male would notice a female and hover for about a second at a distance of from two to six inches from her and about two inches above the ground. He would sometimes dart a few inches to one side of the female, or even behind her, and hover a short while in the new position. Sometimes he very rapidly changed position three or four times, but most frequently would hover in but one position and then dart down and attempt to mount the female. Often he would bounce up and down on her from once to as many as ten times at an angle of about 70° from the rear substratum, rising about an inch above her each time, and then rest on her for a short while. Sometimes the hovering would be omitted and the bouncing commenced immediately as the male approached, in which case he might hover in one or two positions afterward and then attempt to copulate, with or without bouncing again. The females apparently paid not the slightest attention to these antics and one female continued to suck placidly at a prey while a male assiduously played his game for perhaps fifteen seconds before giving up and flying away.

D. setifer Lw. This species was abundant at the edge of a mill pond on a branch of the Huron River in Sharon Township, Washtenaw County, Michigan, on June 30, 1940. The flies, females in large preponderance, were on partly submerged debris blown to the shore, including yellow pond lily (*Nymphaea advena*) remains cut from the other side of the pond. This species is one of the few with a dark spot at the apex of the wing in the male. The male stood immediately *behind* the female, reared up on all sixes, his head just above the tip of the female's wings (the scales on the lower part of the back of the head in the male are particularly broad and bright white in this species). He rapidly flashed his wings sidewise in very quick succession, apparently first one wing and then the other, but the process was so rapid that it was difficult to tell whether the wings may not have been flashed out simultaneously. This was done for a short time and then the fly attempted to copulate. The females observed would thereupon move away. The hind tibiae and tarsi of the male of the species are dark and heavily bristled, but no apparent effort was made to display them.

On finding *setifer* plentiful on mud flats at the water's edge on the Rouge River in Detroit, Michigan, on July 4, 1941, the opportunity again presented itself for observing this species during the early afternoon. The females were again in preponderance and could be easily recognized among other *Dolichopus* by their size and reddish glint. While the females were "nosing" about at the extreme edge of the water, the males seemed to spend most of their time hovering from side to side in rapid flight a short distance above or a little before the females. This action is described as hovering since the insect remains facing the female and merely oscillates laterally. The length of the oscillation varied from about two to six inches, usually four. If the female made a short flight the male would follow and resume his oscillatory hovering. Sometimes he would suddenly attempt to copulate, but never with any success.

Especial effort was made to observe the wing-flashing as noted in Sharon Township, but none was seen. Inasmuch as the sun was bright and the air quite warm I decided to watch this species again on the following morning.

On the morning of July fifth another trip was made down to the river at about nine-thirty o'clock, at which time the temperature was about 70° F. and dew was still on the vegetation. This time the flies did not keep so close to the water's edge, but many were found on nearby vegetation (*Sagittaria, Polygonum* and grasses).

The hovering was again observed, but this time after a little hovering the males were seen several times to take the above described posture behind the female and assiduously flash their wings several times before the females compelled them to stop by moving away. It here seemed that the flashing was alternate.

Setifer was still abundant at the River Rouge on August 17, 1941, but no observations were made.

D. albicoxa Aldrich was first observed on fallen leaves on the surface of a cement pool in my yard at Detroit on June 24, 1939. The male hovered an inch or so above the pool a short distance before the female, occasionally dipping to touch the water.

At the time the above observations on *setifer* were made (July 5, 1941) a few *albicoxa* were also seen. The male hovered stationary about four inches before the female and about two inches above her. The hind legs were held high, curved a little above the level of the abdomen, while the middle and fore legs were hanging down, the fore legs with their black tarsal pads held close together. No dipping was observed, but the males would occasionally shift position a little from one side to the other.

D. gratus Lw. On highway M–60 between Burlington and Tekonsha, Michigan, a small branch of the St. Joseph River enters a virgin beech-elm forest with an undergrowth comprised largely of prickly ash (*Xanthoxylum americanum*). Here on June 1, 1941, *gratus* was found at the edge of the stream. The male was seen to chase the female over the water, occasionally making a jab at her.

The species was also abundant in a beech woods at Schoolcraft and Levan Roads, Wayne County, Michigan, on June 15, 1941. The undergrowth here was largely *Benzoin, Sassafras* and *Rubus*. It was not possible to make observations.

By June 30, 1941, *gratus* had become abundant in my garden at Detroit, which is in a small woods containing several beech trees. One of the favorite resting places for the males was the white portions of the leaves of a variegated plantain-lily (*Hosta* sp., cultivated). They seemed to have no definite epigamic display but were very active, continually chasing each other about. Several times one was seen standing closely behind another, reared up and apparently attempting copulation. A few days later, on July 4, the flies were seen in a concrete pool in my garden. The pool was unkempt, many dead leaves having been allowed to accumulate in it, and the few inches of water in it formed of it a typical woodland pool. Here *gratus* was occupied in chasing each other about at a distance of an inch or less above the water. Frequently one was seen in close pursuit behind another, once in a while making a jab at it. The flies would usually alight on a leaf lying on the surface of the water but seemed to have no objection to alighting on the water if necessary.

It may be remarked that *D. gratus* Lw., *D. calcaratus* Aldrich and *D. mercieri* Parent are doubtfully even varietally distinct.

D. latipes Lw. Early in the morning of August 17, 1941, this species was found in numbers on the muddy banks of the River Rouge in Detroit, the same locality where the observations were made on *D. setifer, albicoxa* and *ovatus.* There had been much rain during the previous few days and a heavy dew covered the vegetation along the river. *Latipes* seemed to prefer the shade among the arrowhead and smartweed. Probably due to the cool temperature (about 65° F.) the flies were easy to observe as they did not move as rapidly as the other species previously observed. They were quite gregarious, a score of individuals sometimes being seen in a space about six inches square.

This species has the middle tarsi broad and black and is related to *D. aldrichii,* whose epigamy has been described by Aldrich (Van Duzee, Cole and Aldrich, 1921, p. 4).

The male stealthily approached on foot to within an inch of the female, at each step lifting and extending the middle legs and curving inward the blackened terminal joints of the middle tarsi. In this action he reminded one of a cat treading a wet surface or of a prancing horse. Once he had approached either by flight or by stealth to about a half inch of the female he stood still in a normal position, lifted his middle legs, usually alternately but often simultaneously, and extended them outward and a little forward, flexing and extending the tarsi and gesticulating with them in a quite varied manner. Frequently two or three males would stand about a female wildly gesticulating with their extended middle feet.

After gesticulating a while the male would usually attempt to mount the female. Then she would fly off without him, as she often did before he finished his leg-waving.

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A CURIOUS HABIT OF AN EMPIDID FLY; FURTHER NOTES.

BY GEO. STEYSKAL, Detroit, Mich.

When the first observations on *Rhamphomyia fumosa* Loew were made during 1939 and 1940 (reported in this Bulletin, vol. XXXVI, p. 117; 1941), no males were seen in the vicinity of the swarming females. In Detroit from June 8 until June 26, 1941, both sexes of *fumosa* were more abundant than before, and on June 16, 17 and 26 swarms were observed at dusk. This time males were seen.

There was a large swarm in my garden on all three dates next a number of large royal ferns (*Osmunda regalis* L.), a few yards from the spot where they were seen in the previous seasons. The swarm certainly included over a hundred females. Occasionally a pair would be noticed flying somewhat more rapidly than single females. They would often separate as much as two yards from the swarm and would usually fly at a little higher elevation. The pairs were never seen to alight although single females were seen to do so in several instances.

Each time a mating pair was swept into the net a prey was found in a dead or moribund condition. Whether or not the female had possession of the prey could not be determined since by the time the net could be held up for examination the sexes had separated and were actively trying to escape. The prey was as follows. June 16: 2 small caddis flies, 2 small crane flies (*Dicranomyia liberta* O. S.), 4 gnats (*Chironomus* spp.); June 17: 7 *Chironomus* spp., 5 *Dicranomyia liberta,* 2 mosquitoes (*Aedes stimulans* Wlk., *Culex* sp.), 1 small *Rhamphomyia* sp.; June 26: 4 *Chironomus* spp., 3 *Dicranomyia liberta,* 1 small caddis fly.

NOTES ON ARHAPHE CICINDELOIDES WALKER AND JAPETUS MIMETICUS BARBER.

By J. R. de la Torre-Bueno, Tucson, Ariz.

The most curious and seemingly least known of the Pyrrhocoridae are the genera *Arhaphe* Herrich-Schaeffer 1853 (type *carolina* Herrich-Schaeffer 1853), and *Japetus* Distant 1883 (type *sphaeroides* Distant 1883). The first genus contained only two species, the type and *A. cicindeloides* Walker 1873, until 1920, when *breviata* was added by H. G. Barber. The second genus was set up by Distant for one species, the type; in 1911 Barber described a second species, as *Arhaphe mimetica,* later transferred by the author to *Japetus*, where it clearly belongs.

The facies and structure of these two genera might seem to indicate they form a distinct group in the subfamily Euryophthalminae. The globose head, the appressed eyes, the apparently constant brachyptery, would at first glance set them apart from the other genera in the subfamily. In fact, later examination and close study might go so far as to raise them to the rank of a subfamily Arhaphinae. What is said, however, are merely indications for a future re-examination of the group in relation to others in the subfamily.

It should be pointed out that the spelling of the name of the type of *Japetus* is *sphaeroides* Distant 1883, Biologia Centrali Americana. Rhynchota I; not *sphaerodes,* as R. H. Hussey consistently makes it in his catalogue of the Pyrrhocoridae (General Catalogue of the Hemiptera, Fascicle III, 1929).

Search through the various references to these two genera reveals only *one* note as to the habits of either—namely, Barber 1910 (Jour. N. Y. Ent. Soc., XVIII: 38) in his paper "Some Mexican Hemiptera-Heteroptera New to the Fauna of the United States." He notes in this as to *Arhaphe cicindeloides* Walker, "I found this species rather common in the Huachuca Mts., Arizona, running about on the ground among dead leaves." My own field notes which follow confirm this by close observation of *A. cicindeloides* in nature on two different occasions in Madera (also known as White House) Canyon, in the Santa Rita Mts., Arizona, one on April 19, 1940, and the other on May 5, 1942. Both times the insects were found walking about in or among dry fallen leaves, mostly singly, although some were noted in copulo.

They mate in the ordinary end-to-end manner common to many bugs, and walk about in this position. If alarmed, the mating pairs separate instantaneously and run to hide among the leaves. A female brought home alive was noticed to extrude a slender, sharp, curved ovipositor, about 3 mm. long. One might deduce it is used to insert the eggs in a somewhat hard or solid substance, dead leaves for instance.

The bugs are quite common, as on the two occasions I have noted at least 60 individuals in a restricted area, among leaves lying in depressions on the ground; but they also walk about on bare spots. One was taken by Dr. W. D. Funkhouser on an oak. Mr. A. A. Nichol has informed me that they are abundant under bear grass.

Four specimens, males and females, were brought home and released in my yard. Immediately, and naturally, they sought shelter in the Bermuda lawn grass and started to climb up the green blades, on which they proceeded to feed, as I carefully noted.

Why the specific name *cicindeloides?* It is true that mounted specimens have a vague resemblance to the beetles, but when living and walking about the insect neither looks nor acts like a *Cicindela.*

In nature, the black-and-white pattern above produces the effect of a large black ant, which is enhanced by the walk and vibration of the antennae. But no such type of ants was seen in the area. All the black ants seen commonly running about were slender and small, barely 6 mm. long. *A. cicindeloides* on the other hand, is stouter relatively to its length of about 12 mm.

Japetus mimeticus Barber has also been taken concealed in dry leaves under an oak, in the Santa Rita foothills, by Owen Bryant on two occasions, the second time with me, when we secured 4 adults and one nymph, on November 2, 1935.

A Note on Preparing Diptera.—It is my opinion that Diptera should be pinned after being in the killing bottle no more than a couple of hours, less in hot weather, and a half hour is sufficient. If the pin bearing males of many flies such as Muscoids generally, Sciomyzidae, Lauxaniidae, etc., is stuck very obliquely into a piece of balsa wood or corrugated cardboard, one or more pins may be placed in the board just above the genitalia for support and the genitalia may be carefully pried open with another pin and that pin fixed into the board to hold the genitalia open while drying. This results in a great saving of time in determining and generally better specimens. If possible the wings should be "flipped" up and the legs pulled down away from the body when pinning.—GEO. STEYSKAL, Detroit, Mich.

NOTES AND DESCRIPTIONS OF NORTH AMERICAN STRATIOMYIDAE.

By Frank M. Hull, University of Mississippi.

I have been fortunate in collecting a number of additional species of North American Pachygasterinae in recent years and as there appear to be undescribed species in the material I present descriptions of these with notes upon others. The types are in the author's collection.

Neopachygaster reniformis n. sp.

These flies are similar to *N. maculicornis* Hine which I collected in Ohio and Iowa, but differ in the segregation of the brassy or silvery mesonotal scales into three obscure stripes, whereas they are uniformly and densely placed in the other species. There are numerous minute tubercles present upon the scutellum, absent in *maculicornis* Hine. As such tubercles have been given as a distinguishing character in part for the genus *Eupachygaster* by other students it appears that the new species may be intermediate between these genera. The eyes are separated in both sexes.

Length 3.7 mm. Antennae placed at the middle of the head in profile, or barely above. The antennae are short, the third joint globose or reniform, orange in color with white spots and the inner surface black centrally; arista pale. There is brilliant silvery pubescence upon the sides of the face and for a short distance along the margin above the antennae. Front shining black, punctate on either side, the middle smooth without impressed line. Mesonotum with thick, silvery scale-like pile, less dense than in *maculicornis,* and disposed as a median longitudinal stripe of pile, narrowly separated from the lateral areas of this pile; in the female this pile is pale yellowish or brassy. The pleura have a vertical middle band of silvery pile. Halteres with opaque, white knob. The scutellum is black, microtuberculate especially about the margin and more pronounced in the male; its pile in the male is conspicuously short-silvery scale like throughout but in the female pale in color basally, blackish in part near the apex. Abdomen of the short, globate type, wholly shining black with short, appressed, silvery or pale yellow pile. Legs yellowish-white, the femora, except their narrow base, and the apex black; pile short and silvery; coxae black except distally. Wings as in *maculicornis;*

basal portion of subcosta blackish and more pronounced in the male.

Holotype: a male; allotype: a female and twelve paratyes all from the University campus, Mississippi. Collected late in May 1940–41. This species appears to differ further from *maculicornis* in having the femora black centrally instead of brown. All of my series of *maculicornis* in both sexes have the femora much paler. In the males the silvery scutellar pile seems to come down and cover the rim; the black tubercles of *reniformis* are the prominent thing upon its margin.

Eupachygaster punctifer Malloch

Malloch described the female of this species and states in key that males of *Eupachygaster* have the eyes separated. I have specimens answering the description of *punctifer* from State College and from Oxford, Mississippi. The males, all from the latter place and only recently collected, have the eyes in the male practically touching yet actually very narrowly separated; they might be considered holoptic. My specimens are not in complete agreement with the scutellum figured by Malloch and it is possible that they are a different species.

Eupachygaster henshawi Malloch

I have several specimens that appear to be this species. They are a female from State College, a male and a female from Oxford, Miss. Like the preceding species the males are practically holoptic.

It differs from *punctifer* in the more shallowly sloping scutellum and in the absence of silvery scales upon the abdomen.

Pachygaster flavipennis n. sp.

Characterized by the bicolored wings, the apical half or more yellow, the base brown, which distinguish it from *pulcher* Loew.

Female. Length 3.8 mm. Antennae located a little below middle of head in profile, short, the third joint orange and much broader than long, its segments white lined; arista pale. The sides of the face below the antennae, except for a narrow midline, are densely yellowish-white pubescent; this pubescence extends a short distance above the antennae. Front shining black, punctate on either side, a prominent pit in the middle about midway. Thorax and pleura shining black, the mesonotum densely short, golden, appressed pilose, the pile set in microrugae; scutellum concolorous, its pile a little longer. Halteres light brown. Abdomen round, shining black, short, very broad, quite convex. Its microscopic, short, erect pile is pale yellow. Legs light brownish-yellow, the femora except the apex, dark brown. Wings with the third vein furcate. A little more than the outer half of the wing and its veins are pale yellow; the basal portion and its veins smoky grey.

Holotype: one female, Puerto Castilla, Honduras. xi–21–1926 (R. H. Painter coll.)

This species appears to be undescribed and quite distinct.

NOTE ON THE MESOTHORACIC SPIRACLE OF THE MORMON CRICKET.

By Leo W. Tannenbaum, Amherst, Mass.

In a study at the Montana State College of the external morphology of the Mormon Cricket, *Anabrus simplex* Haldeman, it has been noticed that the spiracles and tracheae of the mesothorax are modified in an interesting manner. In the membrane between the propleuron and mesopleuron there may be seen two spiracular openings in close juxtaposition. The larger of the two openings is the posterior and it is guarded by numerous tiny setae. This large opening gives immediate entrance to an enlargement of the trachea. The smaller or anterior opening is guarded by two small sclerites. The posterior sclerite appears to be part of the peritremal sclerite of the posterior opening. The smaller opening gives immediate entrance to a small trachea. The tracheae of both entrances do not lead into a common chamber and are apparently in no way connected. The large opening and the enlargement of the trachea into which it leads is connected transversely with its fellow on the other side of the thorax by means of a very narrow trachea. From the body of the enlargement a large trachea leads directly to the front leg. This trachea is about one-third the diameter of the leg itself and extends down the leg past the auditory apparatus. The smaller trachea extends forward to the head where it branches. Midway between the head branches and the orifice it gives off another branch sharply in a ventral direction. This branch divides several times also. One of the subsidiary branches descends to the front leg and another to the long ventral tracheal chain. The above-mentioned modifications may exist more generally among Decticines, since the outward manifestations have been noticed by the author in *Peranabrus, Pediodectes* and *Atlanticus.*

BOOK NOTES.

Byways to Adventure—A Guide to Nature Hobbies, by Edwin Way Teale. Pp. i–x + 1–222. (Dodd, Mead & Company, New York. $2.75.)

In the last few weeks three books, interesting, useful and important have reached the editor. In spite of all the cares and menaces of war, it is most heartening to realize that scientific activity in our free land is still at full tide. We as Americans, North and South, must fully understand that we are the last stronghold of free spirits; that on us rests the salvation of free culture and free science.

Dr. Teale gives the most generalized of the three. *Byways to Adventure* is a most useful and informing book, ranging the natural sciences as it does. It is, in fact, a guide for the amateur, to show him what has been done, how it has been done and who has done it, in the ranks of the non-professional in every line. The introductory chapter (I), Byways to Adventure, begins with these words, which are an addition to our own general remarks above:—"The simple things of the natural world take on added appeal in time of tension and trouble. . . .

"A valuable asset for either calm or troubled hours is an interest in the natural world about us. . . . From boys, with energy to spare, to retired professional men, with time on their hands, numerous people have found opportunities for fun and relaxation—and sometimes achievement as well—in nature avocations."

It (this chapter) goes on to point out the notable amateurs who have achieved eminence; and a number of classics in the field of natural history. I love this all-embracing name, it is so far from such modernisms as the stilted "Biology," or the faintly patronizing "Nature Study": and still further from the highly professionalized "Natural Sciences." We moderns suffer acutely from what a preacher called "a rush of words to the face." We are everlastingly trying to make language more precise and more technical. In the process, we forget that words are charged with emotionalism, and that as all emotional things, they can never reach a cold level of unvarying exactness with an identical meaning to all men.

The other chapters range through Bird Watching, The Pageant of Weather, Exploring the Sky (astronomy), Journeys to Lilliput (insects), Deserted Homes (shells), Reptile Lore, The World of Trees, The Green Realm—The Plants, Wonderland of the Microscope, Rock Hobbies, The Four-Footed, Fossil Hunting, The Underwater World, Adventures in Conservation, Nature in Focus (photography), and The Outdoors Brought Indoors—Museums.

This is the barest outline of the contents. Each chapter tells of the distinguished amateurs and each chapter has a list of books on the subject for the non-technical. The last lists museums from Arizona to Wyoming, where the wonders of the natural world are to be seen in one way or another.

One or two lapses are obvious; which make one wonder why publishers do not have proofs read by persons familiar with the terminology of the natural sciences. And these lapses seem strange, too, since proofs have from five to seven independent readings by various people.

Dr. Teale deserves the thanks of all inquirers into nature for the wealth of exact information he gives the amateur.

Insect Transmission of Plant Diseases, by Julian Gilbert Leach, Ph.D. Pp. i–xviii + 1–615, figs. 1–238. (McGraw-Hill Book Co., Inc., New York. $6.00.)

This note is for the purpose of bringing strongly to the attention of all working on the biology of insects this most important contribution, even though it first appeared in 1940.

The very emphatic role of insects as vectors of human and animal disease is now well-established and known, particularly of those insects that feed on vertebrate blood. But up to a very recent period, the part played by insects, especially by sucking insects, in the transmission of plant diseases, has not had the intensive attention it merits. The visible damage caused by chewing insects and by those insects which develop within plant tissues, and whose injuries are readily detectable, has engaged the attention of most entomologists.

On the other hand, the plant pathologist has found himself confronted with various bacterial and virus diseases, which seemed to appear almost spontaneously. Up to the early years of this century, nothing positive was known with regard to the function of insects as transmitters of plant disease. The bulk of the important literature has appeared in the last ten years.

Dr. Leach has assembled all this scattered data; and we now have the most important work and reference book on the subject. What stands out in his introductory chapter is how entomologists and plant pathologists have inhabited air-tight cubicles insulated against each other. Now we are seeing the other side of the picture, in which plant pathologists and general zoologists pronounce pontifically on insects without adequate knowledge of insects, for entomology is still the "Little Orphan Annie" of biology. Of course, the real solution is for *both* to work cooperatively, the expert plant-pathologist and the biological entomologist. The one, in general, knows little about insects, except what he may have gathered in a general course and from general texts; the other gets a little taxonomic botany on the side, and very little else.

The work under discussion, as a whole, is a happy coordination of two branches of biology which are in themselves closely bound together. The introduction deserves very careful reading, as it brings out many principles worth pondering and acting on.

As a whole, this work of Dr. Leach is indispensable as a foundation and for reference. Each chapter has an extended bibliography of great value and there is also a short glossary. Naturally, the extended treatment of its many topics must be sought in the separate papers listed.

While this book may seem outside the scope of entomology proper, its wide range of subjects and the mass of factual material it brings together about insects, combine to make it a volume which should be on the shelf of every student of the life and habits of insects.

We here take pleasure in pointing out again the real service the publishers have been doing for a long time past to the science of entomology.

J. R. T.-B.

***Mischocyttarus cubensis* var. *mexicanus* (de Saussure), Native in the United States. (Hymenoptera, Vespidae).**—In this Bulletin for October 1940 (vol. XXXV, p. 140) I reported this social wasp being taken in Texas from a bunch of bananas in a store. I have recently seen a male collected in the field at Brownsville, Texas, by D. J. and J. N. Knull. This form may therefore be regarded as indigenous in the extreme southwestern corner of Texas, which has many other Mexican insects. The wasp is common in the neighboring State of Tamaulipas.—J. Bequaert, Harvard University Medical School, Boston, Massachusetts.

PROCEEDINGS OF THE SOCIETY.

Meeting of December 11, 1941.

No Quorum.

Informal discussions.

Mr. William T. Davis: "The 17-Year Cicada, Brood XV." Manuscript submitted for publication in the Bulletin.

Mr. George P. Engelhardt: "The Fall Canker Worm, *Alsophila pometaria.* A serious outbreak predicted for 1942."

Meeting of January 15, 1942.

A regular meeting of the Brooklyn Entomological Society was held at the Brooklyn Museum on January 15, 1942, at 8:00 P.M. The meeting was called to order by Mr. Wm. T. Davis, president. Members in attendance were: R. R. McElvare, Otto Buchholz, Edwin W. Teale, G. P. Engelhardt, W. T. Davis and A. T. Gaul. Visitors were Dr. Henry Fox, and Dr. and Mrs. Clarence J. Goodnight.

Minutes of the preceding meeting were read and approved.

This was the annual meeting. The treasurer read a satisfactory report. The report of the publication committee was approved. Mr. Buchholz, chairman of the nominating committee, remarked upon the resignation of Mr. Siepmann as Secretary of the Society, and submitted the following nominations: President, Wm. T. Davis; Vice President, R. R. McElvare; Treasurer, G. P. Engelhardt; Secretary, A. T. Gaul; Corresponding Secretary, C. G. Siepmann. On motion, the nominations were closed and the Secretary ordered to cast the vote of the Society for the nominees, who were then declared elected.

Mr. Davis discussed *Tibicen lyricen* DeGeer, and *T. lyricen* var. *engelhardti* Davis. *T. lyricen* is one of our most successful Cicadas. *T. engelhardti* is a geographical race of *T. lyricen* which is found in the highlands back from the coast in the Southern States. It has recently been found coexistent with *T. lyricen* at Cincinnati, Ohio.

Mr. Teale showed a phial of pollen pellets collected from the pollen baskets of honey bees by a device invented by Dr. J. I. Hambleton of the Division of Bee Culture of the U. S. Department of Agriculture. The pollen pellets can be collected in great quantities. They contain considerable amounts of vitamin B.

Dr. Henry Fox was the speaker of the evening. His subject, "Remarks on Some Aspects of the Biology of the Japanese Beetle and of Certain Orthoptera."

The adult Japanese Beetle is usually found in the New York region from July 1 to September 1. In extreme instances it may be found from June 15 to early November. The beetles mate and lay eggs two days after hardening as they are sexually mature upon emergence.

The eggs are most abundant in the ground from July 1 to August 10. The larvae feed upon grass roots and organic material in the earth.

Rare instances are on record where first instar larvae survive the winter. This can only occur when the larvae have first had a chance to feed during the autumn. Eggs will hatch at a temperature of 12° Centigrade, but this temperature is too cold for the larvae to feed. Eggs never hatch after wintering.

The larvae are positively thermotropic. In summer the surface of the soil is warmer than the substratum, and the larvae are found in the first inch of topsoil. In the fall the substratum is warmer than the surface and the larvae dig downward. As they are inactive at 10° Centigrade, they rarely succeed in burrowing deeper than 4 to 6 inches. They become dormant before winter really sets in.

A constant temperature of – 15° Centigrade will kill all the larvae. The soil will rarely become so cold, particularly if blanketed with snow.

A soil survey of immature forms reveals an increase in population from July 1 to September 1, when new eggs are being laid. From September 1 to October 15 the population drops due to diseases and predators. From October 15 to April 15 the population remains static due to dormancy. From April 15 to June 15 the population again drops. After June 15 the beetles emerge and the survey becomes erratic.

The rate of larval development depends upon temperature, moisture and food. The eggs increase 100% in volume within the first five hours after deposition. They take up this moisture from the surface of the surrounding soil particles. They cannot absorb it from the moist atmosphere.

By varying the available food supply at a constant temperature, the first larval instar varied in duration from 13.7 to 37.6 days.

The larvae undergo a diapause period, apparently to prevent them from pupating before spring. Pupae cannot survive the winter. The diapause may occur at any of the three larval instars, depending upon temperature. Regardless of the instar at which diapause takes place, larvae require nearly the same length of time to develop; from 139 to 170 days.

Dr. Fox also discussed the oothecae of the Mantes, *Tenodera sinensis* and *T. angustipennis,* both of which were accidentally imported from the orient.

From the Bronx, N. Y., the oothecae of *T. sinensis* averaged 261.1 eggs, of 67 oothecae. Of 53 oothecae from Ocean View, N. J., the average was 296 eggs. The difference is so much greater than the mathematical probability of error that it is doubtless a difference due to latitude.

The oothecae of *T. angustipenis* from Ocean View, N. J., averaged 233.5 eggs. This is consistently lower than the number of eggs in *T. sinensis*.

The meeting adjourned at 10: 10 P.M.

A. T. GAUL,
Secretary.

MEETING OF FEBRUARY 12, 1942.

A regular meeting of the Brooklyn Entomological Society was held at the Brooklyn Museum on February 12, 1942. The meeting was called to order at 8: 00 P.M. by president Wm. T. Davis. Members in attendance were: Otto Buchholz, F. T. Naumann, H. J. Dietz, Dr. G. S. Tulloch, G. P. Engelhardt, A. T. Gaul and Wm. T. Davis. Visitors included: Miss B. Dietz, John C. Lutz, 3rd, G. M. Smith, and Dr. and Mrs. C. J. Goodnight.

The minutes of the preceding meeting were read and approved. Mr. Davis remarked that a quorum was not present at the last meeting, and that the annual elections were, therefore, not valid. Mr. Buchholz proposed a motion that all business conducted at the January meeting be approved. This was favorably voted upon.

Mr. Engelhardt remarked upon the satisfactory state of the treasury, and discussed the probable success of the new volume of ENTOMOLOGICA AMERICANA which contains Dr. Joseph Bequaert's treatise on the Ked Flies. Mr. Engelhardt read a news report about our former president, Mr. W. T. Bather, of 504 Prospect St., Nutley, N. J., who has reached his 80th birthday.

Dr. Tulloch spoke on "Yellow Fever in the Tropics." Yellow fever is an acute infection marked by rapid onset, short duration, a black bloody vomit, and a distinct yellowing of the body. Death occurs from the sixth to the ninth days; all patients surviving this period are likely to recover.

Yellow fever is a modern disease. It was first described medically from Brazil in 1680, and in Africa in 1700. Since these dates it has made periodical summer excursions into the temperate zones. It has appeared in Montreal, Canada, and even in Europe. It is limited to the Atlantic basin, being unknown in Australia and the Orient.

As early as 1881, Carl Finlay claimed that the disease was transmitted by a mosquito. In 1898, Dr. Carter in Mississippi reported the incubation period as 12 to 21 days. In 1900 a U. S. Army Commission was sent to Havana where they proved that *Aëdes aegypti* was the vector. In 1901, Major Gorgas was able to stamp the disease out of Havana in a few months; at the same time Cruz cleaned up Rio de Janeiro.

In 1927 workers in West Africa discovered that the Rhesus monkey reacted to the disease in a manner very like man.

Yellow Fever is caused by a filterable virus which attacks both the nervous and visceral systems. The liver turns yellow and exhibits typical histopathological changes. In 1931 Brazil established a law which requires that a piece of liver be studied from each human who died from a fever of less than 15 days duration. This is called the "viscerotomy service."

In 1930 the white mouse was found susceptible to the disease when the virus is injected into the brain.

Between 1900 and 1928 investigators thought they had conquered Yellow Fever. In 1928 however, an epidemic broke out in Rio when very few Aëdes mosquitoes were in evidence. This was followed in 1932 with another epidemic without any mosquitoes at all! From 1933 to 1940 successive mosquitoless epidemics were reported. So the fever has been divided into the urban type, carried by the mosquito, and the jungle type, having the same symptoms but being carried by an unknown vector.

The viscerotomy service has established that many persons die of Yellow Fever in the jungle highlands where the Aëdes mosquito cannot exist. Apparently the disease exists in jungle animals and is transmitted to man when he enters infected areas. Certain jungle mosquitoes can harbor the Yellow Fever virus, but it has not been shown that they can transmit it.

In 1932 an antibody test was developed, which would determine if a person had ever had Yellow Fever, and which would serve as a quick diagnosis.

It was found that the virus could be grown on a medium of hen's eggs. After experimenting on a series of eggs, it was found that the virus had mutated. In this one instance the mutant was harmless to man and would confer an immunity against the actual disease, when injected. After this virus has multiplied for a certain number of times it will revert to the original disease.

The meeting adjourned at 10:00 P.M.

ALBRO T. GAUL,
Secretary.

EXCHANGES

This one page is intended only for wants and exchanges, not for advertisements of articles for sale. Notices not exceeding THREE lines free to subscribers. Over lines charged for at 15 cents per line per insertion.

Old notices will be discontinued as space for new ones is needed.

DIURNAL LEPIDOPTERA.—Have many desirable western species to exchange, including *Argynnis atossa, macaria, mormonia, malcolmi, nokomis; Melitaea neumoegeni; Lycaena speciosa;* etc. Send lists. Dr. John A. Comstock, Los Angeles Museum, Exposition Park, Los Angeles, Calif.

BUY OR EXCHANGE: Pinned Microlepidoptera and papered Pieridae of North America. Full data with all specimens. Named material of all groups offered. Alexander B. Klots, College of the City of New York, New York City.

PENTATOMIDAE: Want to buy or exchange Petatomidae from the United States and Mexico. Herbert Ruckes, College of the City of New York, 17 Lexington Ave. N.Y.C.

ACALYPTRATE DIPTERA OF THE WORLD wanted for determination or in exchange for other insects. Geo. Steyskal, 23341 Puritan Ave., Detroit, Mich.

LEPIDOPTERA COLLECTION.—Excellent condition, fine representation of named N. A. Diurnals and Nocturnals. Also choice selections of tropical Papilios, Sphingiids and Saturniids. Hy. J. Dietz, 3053 Hull Ave., New York, N. Y.

WANTED.—Living colonies of Vespine wasps. Buy or exchange in other orders. A. T. Gaul, 401 Washington Ave., Brooklyn, N. Y.

WANTED.—MANTID EGG CASES from West of the Mississippi River. If interested in collecting, write: Osmond P. Breland, The University of Texas, Austin, Texas.

INTERESTED IN AEGERIIDAE: would like to buy or exchange for these. Also interested in beetles, moths and butterflies of the world. R. E. Griffin, 4514 S.E. 18th Ave., Portland, Oreg.

Vol. XXXVII JUNE, 1942 No. 3

BULLETIN

OF THE

BROOKLYN ENTOMOLOGICAL SOCIETY

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Meetings are held on the second Thursday after the first Tuesday of each month from October to June, inclusive, at the Central Museum, Eastern Parkway and Washington Ave., Brooklyn. The annual dues are $2.00.

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BULLETIN
OF THE
BROOKLYN ENTOMOLOGICAL SOCIETY

Vol. XXXVII June, 1942 No. 3

STUDIES ON THE PLECOPTERA OF NORTH AMERICA. III. ALLOCAPNIA.*

By John F. Hanson, Amherst, Massachusetts.

For several years I have been particularly interested in the winter emerging stoneflies of Amherst and surrounding localities. In my collecting there has been discovered a new species of *Allocapnia* that occurs very commonly in this region. Descriptions of this species and of the previously unrecognized and improperly placed *Allocapnia nivicola* (Fitch), along with other notes on the genus *Allocapnia* are presented here.

In the genus *Allocapnia* in North America there are, including the species described here as new, ten valid species that with but one exception (*A. nivicola*) have been well described by Needham and Claassen (1925) and by Frison (1929, 1935). The males have excellent specific characters in the supraanal process and in the dorsal projections of the seventh and eighth abdominal segments. Frison found the antennae to show supplementary specific characters in some cases. In the female sex he also discovered that *A. vivipara* Claassen can be distinguished from other species by the lesser extent of membranization on the dorsal surface of the abdomen. Almost without exception the females can be distinguished by the shape of the eighth sternite. One supplementary character, which I think has not previously been observed, is that in *A. minima* (Newport) and *A. maria* n. sp. the basal section of media of the hind wing is usually atrophied, sometimes only partially but often as far as the cord.

Allocapnia maria n. sp. (Figs. 1, 3.)

Though not the first new stonefly I have described, it is the first I discovered and the one that gave me my greatest entomological thrill. I take great pleasure in naming it *Allocapnia maria* after my wife who has always been most helpful and inspiring in my work.

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* Contribution from the Department of Entomology, Massachusetts State College, Amherst, Massachusetts.

This species is quite distinct from any other described species in the genus. It is most closely related to *A. minima* (Newport). This is definitely indicated by the similarity in the eighth sternite of the females of the two species, by the atrophy of the basal part of vein M in the hind wing, and by the occurrence, in some males of *A. minima* of a tiny dorsal projection on the seventh tergite corresponding in position to that of the much larger projection on the seventh abdominal tergite of *A. maria*. *A. maria* is readily distinguished from *A. minima* in the male sex by differences in the supraanal processes. Females of the two species are so similar as to be difficult to distinguish, but usually the median plate of the eighth abdominal sternite is larger in *A. maria* than in *A. minima*. Though variable in size and shape, this plate is generally about twice as long as wide in *A. minima;* in *A. maria* it is never twice as long as broad. Due to differences in habitat preference, however, these two species are rarely taken together, so that there is little danger of confusing them. *A. minima* is a species found almost exclusively in very large streams or rivers; *A. maria* is also apparently closely related to *A. forbesi* Frison, but Frison's figures of *A. forbesi* (1929) show several points of difference in the male terminalia.

Length of body, 3 to 4 mm. in male, 4 to 6 mm. in female. Male brachypterous, with the number of abdominal segments covered by the wings varying from 3 to 8. Wings of normal size in female, *i.e.,* extending usually slightly beyond tip of abdomen; with base of vein M in hind wing atrophied. Antennal segments not cylindrical but expanding toward their distal ends.

Male: Sixth abdominal segment infrequently bearing a small dorsal protuberance near its anterior margin. Seventh tergite with a large dorsal, nearly conical protuberance near its anterior margin. Eighth tergite rising sharply from its anterior margin toward a blunt knob on its posterior dorsal extremity. Knob of eighth tergite transverse and very slightly cleft. Ninth segment membranous dorsally and grooved to receive the supraanal process. Supraanal process relatively large and well sclerotized, bearing a few setae on its posterior and lower surfaces near the base. Upper shaft of supraanal process gently curved, slightly grooved above, and of uniform width throughout its length except at the apex which is slightly expanded and membranous above. Lower shaft more deeply grooved above and with a more pronounced curvature than the upper shaft; its cup-shaped apex marked off from the rest of the shaft by deep notches on the lateral flanges.

Female: Eighth sternite with a shovel-shaped concave median plate which is very clearly demarked because of its heavy sclerotization and shiny, glabrous surface. Sclerotized areas of seventh and eighth abdominal sternites fused in middle so that these two segments are not completely separated by membrane.

Collection Data: All specimens listed here were collected by the author except as otherwise indicated. *Holotype* male, *allotype* female—East Amherst, Mass., March 12, 1938. *Paratopotypes*—April 1, 1937, 53♂, 8♀: April 6, 1937, 1♂, 1♀: April 10, 1937, 36♂, 16♀: April 10, 1937 (Bartlett), 16♂, 11♀: Feb. 18, 1938, 6♂: Feb. 25, 1938, 23♂, 3♀: March 11, 1938, 18♂: March 11, 1938, (Bartlett), 34♂, 6♀: March 12, 1938, 82♂, 1♀: March 12, 1938 (Bartlett), 53♂, 2♀: March 15, 1938, 105♂, 1♀: March 15, 1938, 2♂, 2♀, mating: March 19, 1938, 2♂: March 22, 1938 (Bartlett), 45♂, 2♀: April 2, 1938, 1♂, 1♀: April 6, 1939, 1♂: Feb. 26, 1942, 4♂, 1♀: March 5, 1942, 40♂, 4♀: March 8, 1942, 43♂, 3♀: March 23, 1942, 3♂, 3♀: March 27, 1942, 1♂. *Paratypes*—North Amherst, Mass., March 5, 1942, 3♂, 1♀. Belchertown, Mass., March 23, 1938, 26♂, 5♀. Swift River, Ware, Mass., March 23, 1938, 3♂, 4♀: April 4, 1937, 1♂, 1♀. Ware Center, Mass., March 23, 1938, 1♀. Pelham, Mass., Feb. 19, 1938, 1♂: March 12, 1938 (Bartlett), 4♂, 2♀: March 23, 1938, 8♂: April 15, 1938, 1♀: Feb. 26, 1942, 3♂, 1♀: March 8, 1942, 9♂, 3♀: March 23, 1942, 4♂: March 27, 1942, 1♂, 4♀. Sunderland, Mass., March 31, 1937, 3♀. West Whately, Mass., March 17, 1942 (Kulash), 1♂: March 18, 1942 (Kulash), 9♂, 3♀. Whately Glen, Whately, Mass., March 22, 1942 (Kulash), 2♂. Williamsburg, Mass., March 20, 1942 (Kulash), 2♂, 1♀. Types are deposited in the United States National Museum, at Cornell University, at the Museum of Comparative Zoology, in the Massachusetts State College Collection, in the collection of the Illinois Natural History Survey, and in my personal collection.

Allocapnia nivicola (Fitch). (Figs. 2, 4.)

This species also is very common around Amherst. Until very recently I had intended to describe this species as new. However, on a recent visit to the Museum of Comparative Zoology at Harvard University in Cambridge, through the kindly cooperation of Dr.

Banks, I was able to boil out in caustic potash two of the three original types of *A. nivicola* deposited there. These specimens bear only the type number (10114) and Fitch's original collection numbers (4224, 4225, 4235); they bore no locality data. All three of these specimens, one male and two females, are positively identifiable as the species described below. Inclusion of a description here is appropriate since the species is unrecognizable by any other published work.

It is very probable that at the time of his original description of *A. nivicola* (1847) Fitch was entirely unaware of the possibility of the existence of more than one species of *Allocapnia*. This seems especially probable since all the species within the genus look superficially alike and cannot be distinguished except by genitalic characters which were not used at that time. In his original description Fitch made the following statement: "On warm days in the latter half of winter this species may be observed crawling with hurried steps upon the snow. It becomes most numerous about the time the snow finally disappears, and is then often seen on shrubs, fences, and buildings, and not unfrequently finds its way into our houses. It is extremely common, occurring most abundantly in the vicinity of streams of water," etc. One would highly suspect that in his observations as quoted above Fitch was concerned with the true *A. pygmaea,* since it is by far a more common species in the state of New York than is *A. nivicola.* Thus I was surprised at the true identity of *Allocapnia nivicola* (Fitch). It must now be removed from synonymy under *A. pygmaea* (Burm.) where it was placed by Needham and Claassen in 1925.

In abdominal terminalia of the male, *A. nivicola* most closely resembles *Allocapnia pygmaea* (Burmeister). However, the process of the eighth abdominal tergite is trilobed and not bilobed as in *A. pygmaea;* and this process is borne not at the posterior margin of the segment, but about at the middle. Other minor but distinct differences occur in the seventh abdominal tergite and in the supra-anal process. Females of this species are readily distinguished from those of other species of *Allocapnia* by the nearly rectangular, posterior projection of the eighth sternite. *A. nivicola* is a species of small stream or brook type of habitat while *A. pygmaea* reaches maximum abundance in large streams.

Length of body, 4½ to 6 mm. in male, 6 to 8 mm. in female. Male brachypterous, with the number of abdominal segments covered by the wings varying from 5 to 8. Wings of female normal in size. Base of vein M in hind wing not atrophied. Distal end of each antennal segment expanded toward apex.

Male: Seventh abdominal tergite with a tiny, transverse, chisel-like projection slightly anterior to the middle of the segment. Eighth tergite with a larger transverse "chisel" which is about one-third the width of its segment, is trilobed, and is placed at about the middle of its segment. The sloping surface of the "chisel" is toward the rear; the outer and larger lobes or "teeth" of this process are set at a slight angle to each other, i.e. the entire process is not perfectly transverse. Ninth segment entirely membranous above. Supraanal process very similar to that of *A. pygmaea,* large and well sclerotized, bearing a few setae on its lower and posterior surfaces near its base. Upper shaft of supraanal process grooved above, slightly but distinctly angulate near middle, and tapering slightly beyond the middle to a blunt apex. Lower shaft with an expanded subapical portion extending into a tenuous downwardly curved apex; grooved above for the reception of the upper shaft; lateral flanges of the groove bear a few setae.

Female: A small but distinct median rectangularly produced portion of the eighth sternite immediately distinguishes this species in the female sex. This projection is often bent inward so as to be concealed under the posterior margin of its own segment, and is thus most easily visible in distended specimens.

Naiad: Though the naiads of most of the described species of *Allocapnia* are known, it has not been found possible to distinguish one species from another in immature stages except in the case of some fully grown male naiads. Frison (1929) and Claassen (1931) have published keys which are inadequate but are actually the best that our knowledge permits. Since there seems to be an utter lack of variation in color pattern, mouthparts, abdominal structures, etc., within the genus, the possibilities of finding distinguishing characters appears disappointing. The female exuviae which is designated below as nepionotype, similar to other females of the genus, shows no distinguishing characters. Its identity is based entirely on the adult female which emerged from it.

Collection Data: This species has been collected fairly commonly around Amherst by the author and other members of this department. We have also taken it in Pelham, Sunderland, and Williamsburg, Mass. I have taken it in Cobalt, Conn., and in Bel Air, Md. In the Collection at Cornell University I found several specimens from Clinton, Northville, and Monterey, N. Y. confused with *Allocapnia pygmaea* material.

Nepionotype female—Sunderland, Mass., Feb. 26, 1938 (Bartlett).

OBSERVATIONS ON MATING HABITS OF ALLOCAPNIA.

Adults of *Allocapnia* gather most abundantly on bridges and fence rails along roads passing over streams. At such places, in late winter, one can easily find numerous cases of males mounted on the backs of females. Upon close observation most of these pairs will be found to be not mating but merely travelling about together, apparently awaiting a receptive stage of the female. The male usually assumes a position in which his body lies directly above that of the female and in which his head is directly above the mesothoracic segment of the female. The male maintains his position by clinging with his claws to the wings of the female. His hind legs may cling either to the wings or to the cerci of the female, or may aid the female by joining in the operation of walking.

During the act of mating, the male abdomen is turned down over the side of the female's abdomen and then under it. At the same time it rotates through 180° so that its supraanal process faces upward in position to be received by the vagina of the female. As reference to the figures of the male terminalia of the species described in this paper show, the supraanal process of all species of *Allocapnia* is divided into an upper and a lower prong. In the half dozen cases of mating observed (all in *A. pygmaea*) only the upper portion of the male's supraanal process entered the vagina of the female. Through a duct in this upper branch the male genital fluids are transported. The delicate opening of this duct is protected, when not in use in the act of mating, by a rather ingenious mechanism. The unsclerotized tip region is hinged so that it may be folded down and back. Thereby it is protected above by the upper branch of the supraanal process and below by a groove in the lower branch into which it fits.

A mechanism for maintaining union of a mating pair would seem to be necessary, since the female frequently moves and walks about very actively during coition. This is apparently accomplished by the use of another ingenious method. The tip of the lower process of the supraanal process is inserted under the posterior margin of the eighth segment of the male's own abdomen. This process, exerting a force outward, causes the dorsal protuberance of the eighth tergite of the male to press against a bulge in the hinder region of the seventh sternite of the female, thus locking the two insects together rather effectively.

Mating apparently takes place over a great range of temperatures (even below freezing) during the emergence period.

Since the genitalia of all species within the genus are basically very similar, it is unlikely that other species of *Allocapnia* will be found to have appreciably different mating habits than those described above.

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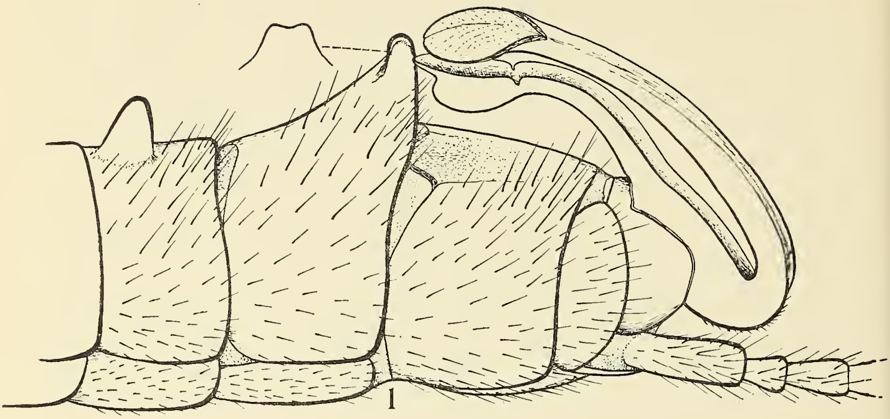
EXPLANATION OF PLATE II

Figure 1. *Allocapnia maria* n. sp., male terminalia, lateral view.

Figure 2. *Allocapnia nivicola* (Fitch), male terminalia, lateral view.

Figure 3. *Allocapnia maria* n. sp., female abdomen, ventral view.

Figure 4. *Allocapnia nivicola* (Fitch), female abdomen, ventral view.



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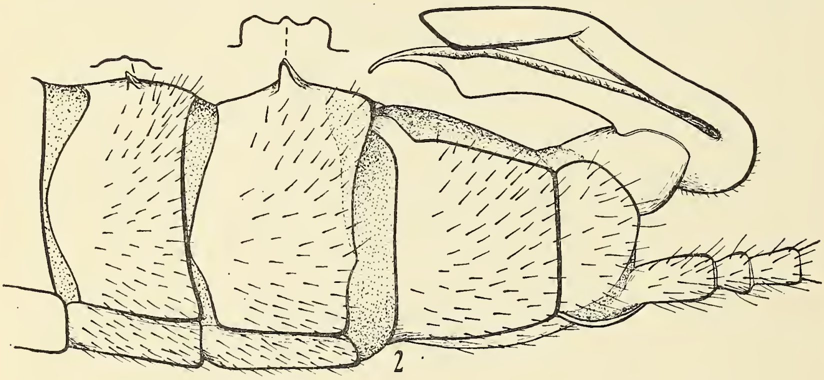

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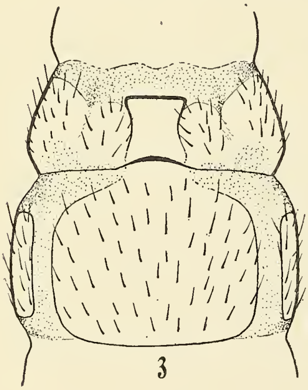

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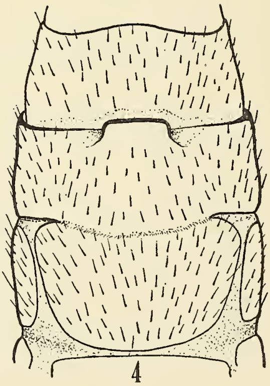

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THE NAME BIBLIS, GENERIC AND SPECIFIC (LEPIDOPTERA, RHOPALOCERA, NYMHPALIDAE).

By W. P. Comstock, New York, N. Y.

The generic name *Biblis* was proposed by Fabricius in his Systema Glossatorum (1807: XI, No. 14). The generic name *Biblis* was considered by Illiger (Illiger's Magaz. 1807: 6, 281, No. 13) who lists the species "Pap. *Biblis, Leucothoë, Nauplis, Neaerea.* 37 Art."

Latreille (Enc. Méth. 1819: 9, 10; 1820: 9, 325, 326) used the genus "*Biblis* Fab.," and gave the new name *Biblis thadana* for "*Papilio N. Biblis,*—Fab." Latreille replaced the species name *biblis* because of tautonymy but this is inadmissible for the Code (article 33) says that names are not to be rejected on account of such tautonymy; *thadana* is a synonym of *biblis.* This usage was continued by Boisduval (in Cuvier, Disiples Ed. 1846: pl. 136) who used the genus "*Biblis* Fabricius" and figured *thadana* in that genus. Westwood (Gen. Diur. Lep., 1851: 405) established the invalid usage of the genus *Didonis* Hübner for the species *biblis* Fabricius.

The first use of the name *Papilio biblis* in the specific sense was by Drury (Ill. Nat. Hist. 1770, title page date; 1773, probable date of list of names referring to text and plates; 6, 10, pl. 4, fig. 2) who used it for a butterfly from "China" which was included in the genus *Cethosia* by Fabricius (1807: 64, No. 4). Fabricius (Syst. Ent., 1775: 505, No. 261) used the name *Papilio biblis* in the specific sense for a different butterfly from "America." The generic name *Biblis* Fabricius (1807: XI, No. 14) has as its first species, as listed by Illiger (1807: 281, No. 13) as first revisor, the name *biblis.*

Papilio hyperia Cramer, 1779 was suppressed as a synonym of *Papilio biblis* Fabricius, 1775 by Hübner (Verzeichniss, 1819: 17); later it was discovered that *Papilio biblis* Fabricius, 1775 was preoccupied (*Papilio biblis* Drury, 1773). *Papilio biblis* Fabricius, 1775 is suppressed as a homonym, and can never be used again; it was stillborn and cannot be brought to life, even when the species is placed in another genus (*Didonis* Hübner). *Papilio hyperia* Cramer, 1779, which was suppressed as a synonym, becomes valid upon the suppression of the homonym *Papilio biblis* Fabricius. (International Code: Article 36.)

The genus *Zonaga* Billberg (Enum. Ins., 1820: 78) is synonymous with *Biblis* for it has the same genotype, *biblis.* The genus

Didonis Hübner (Verzeichniss, 1819: 17) is unavailable for *hyperia* for Scudder (Historical Sketch, 1875: 156) fixed the genotype as *vitellia* Cramer which is now considered congeneric with *lais* Cramer, the genotype (Scudder, 1875: 161) of *Elymnias* Hübner (Verzeichniss, 1819: 37). *Didonis* has page priority over *Elymnias* but under the code (Article 28 c) selection by page priority is not compulsory but is advocated only when other things are equal and the much used genus name *Elymnias* may be validated by usage. *Didonis* is placed in synonymy.

From the examination of these facts there results:

Genus:—*Biblis* Fabricius (1807) XI, No. 14.
Zonaga Billberg (1820) 78.
Didonis, Westwood (1851) [nec Hübner, 1819] 405.
Genotype:—*Papilio biblis* Fabricius, 1775, [nec. Drury, 1773] type by absolute tautonymy (Code: article 30d) (= *Papilio hyperia* Cramer, 1779).
Species:—*hyperia* Cramer (1779) 3, 74, pl. 236, E. F.
biblis Fabricius (1775) 505, No. 261. homonym.
thadana Latreille (1820) 326. synonym.

An Apparently New Food Plant for Corythucha ciliata Say—My friend, the late George P. Engelhardt, always had something interesting to give to others. Last year he sent me a lot of tingids taken on sour gum (*Nyssa sylvatica*) in the Bronx River Parkway, Scarsdale, N. Y. These turned out to be *Corythucha ciliata* Say, the common sycamore (*Platanus occidentalis*) species. I am not aware of its ever having been recorded in numbers from any other food plant.—J. R. DE LA TORRE-BUENO, Tucson, Ariz.

THE AMERICAN COMMISSION ON SCIENTIFIC NOMENCLATURE IN ENTOMOLOGY

The disturbed condition of the world during the last few years has interfered with the activities of the International Commission on Zoological Nomenclature and there is no prospect that this Commission will again function successfully for several years to come. Entomologists in the United States have felt that this situation should not be allowed entirely to stifle progress in the development of nomenclature and the clarification of nomenclatorial problems. At the meetings of the Entomological Society of America and the American Association of Economic Entomologists in San Francisco, in December, 1941, a plan was adopted which called for the establishment of an American Commission on Scientific Nomenclature in Entomology.

In accord with the terms of this plan, Mr. C. F. W. Muesebeck and Professor G. F. Ferris were appointed to organize the Commission. That organization has now been completed and the Commission is ready to function. It includes Prof. J. C. Bradley, of Cornell University; Mr. W. J. Brown and Mr. G. Stuart Walley, of the Division of Entomology of the Department of Agriculture of Canada; Prof. G. F. Ferris, of Stanford University; Prof. T. H. Hubbell, of the University of Florida; Prof. H. B. Hungerford, of the University of Kansas; Dr. E. G. Linsley, of the University of California; Dr. Clarence E. Mickel, of the University of Minnesota; Mr. C. F. W. Muesebeck and Mr. P. W. Oman, of the United States Bureau of Entomology and Plant Quarantine; Prof. A. G. Richards, Jr., of the University of Pennsylvania; Dr. Herbert H. Ross, of the State Natural History Survey of Illinois; Prof. C. W. Sabrosky, of the State Agricultural College of Michigan; Dr. R. L. Usinger, of the College of Agriculture of California. Prof. G. F. Ferris has been elected as Chairman.

The Commission will receive, consider and advise upon such nomenclatorial problems as are presented to it. All acts of the Commission will be in harmony with the International Rules of Zoological Nomenclature, although recommendations for the clarification, extension and improvement of these rules may be made. The Commission will report to the two parent societies at their next annual meeting. Communications concerning matters within the province of the Commission may be addressed to any of its members.

TWELVE NEW SPECIES OF OSBORNELLUS (HOMOPTERA-CICADELLIDAE) FROM MEXICO, GUATEMALA, AND PANAMA.

By Dwight M. DeLong, Columbus, Ohio.

Very little study has been made of the Mexican *Osbornellus* until recently when the author attempted to determine the species of this genus which were in the material collected by Dr. Alfons Dampf during the past few years in various parts of Mexico. Material in this genus was also collected by Dr. C. C. Plummer, Dr. J. S. Caldwell, Mr. E. E. Good, and the author during 1939 and 1941. Dr. Herbert Osborn described *mexicanus* as a *Scaphoideus* in 1900[1] and the author described eleven species in 1941.[2]

Osbornellus alaudus n. sp.

A large species resembling *consors* in general appearance but with distinct color markings and distinct male genitalia. Length 6–6.5 mm.

Vertex appearing broad and almost rounded at apex, a little wider at base than median length.

Color: Vertex pale with dark brown markings. Marginal line of vertex dark brown and another just above pale ocelli forming a minute pale spot at apex and an elongate enclosed spot either side. There is a larger pale spot enclosed with brown just above apex. An interrupted salmon colored band between anterior portions of eyes and a white band between eyes at base. Pronotum dark brown with irregular pale spots along anterior margin. Scutellum dark brown, with faint pale stripes on anterior margin and a triangular white spot about middle of outer margin on either side. Elytra smoky subhyaline with dark brown veins and dark spots on apex of each claval vein and on costal veinlets. Elongate brown markings occur in the discal cell and second anteapical cell. Face brownish with pale arcs.

Genitalia: Female last ventral segment with the posterior margin strongly roundedly produced. Male plates long and tapering, exceeding pygofer. Aedeagus with a long basal spur near base extending half way to dorsal wall of pygofer. Body of aedeagus curved sharply dorsally just beyond spur and longer than the height of the pygofer. The body of the aedeagus is almost uniform in width. A narrow, long spine-like spur arises on the caudal portion just after the aedeagus curves dorsally and extends almost to the blunt rounded tip of aedeagus.

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[1] Jour. Cinc. Soc. Nat. Hist. 19: 197, 1900.

[2] Anales Escuela Nat. de Ciencias Biol. 2: 263–271, 1941.

Holotype male, allotype female and male and female paratypes from Cerro Punta, Panama, December 23, 1939. Collected by T. T. Howard.

Osbornellus acuminatus n. sp.

In form and general appearance resembling *alaudus* but with vertex more angularly produced and with distinct male genitalia. Length 6 mm.

Vertex bluntly angled as long at middle as basal width between the eyes.

Color: Vertex pale, heavily marked, color pattern similar to that of *alaudus* with a marginal black line on vertex and a heavy curved line from ocellus to apex on either side enclosing a small pale spot either side of apical pale tip. A small pale spot just above apex. A heavy dark transverse bar just back of supra apical spot. A broken orange band between anterior margins of eyes. A white band extending anteriorly at middle and margined with brown on posterior portion of vertex. Pronotum dark brown with pale mottling on anterior margin. Scutellum pale with darker basal angles. Elytra pale, tinged with brown. A spot on discal cell, elongated spots in other cells, spots at apices of claval veins and on costal veinlets, brown. Face brown with pale arcs.

Genitalia: Female last ventral segment with the posterior margin strongly roundedly produced. Male plates long, slender, decidedly exceeding pygofer. Aedeagus narrow at base, then enlarged and forming a dorsal thumb-like structure at dorsal portion of enlargement. Beyond this the apical half is narrowed and divided into two proximal parallel portions. The dorso-anterior of these is rather broad in lateral view and has a blunt rounded apex. The ventro-caudal portion is slender, pointed at apex and extends slightly beyond the other portion.

Holotype male and allotype female from Cerro Punta, Panama, collected March 4, 1940, by T. T. Howard.

Osbornellus appressus n. sp.

Resembling *scalaris* in form, coloration and general appearance but with distinct male genitalia. Length 5 mm.

Vertex bluntly angled, as long at middle as basal width between the eyes.

Color: Vertex pale brownish with a white cross on apex, the arms extending toward the ocelli. The base is pale, margined with brown and a white spur bordered with a brown line extends forward to about the middle on each side of a median brown line. Pronotum brown, mottled. Scutellum brown, with a white dash on each side of brown basal angles and a white triangular spot on each side about the middle. Elytra brownish subhyaline with dark brown veins and pale brownish spots in the center of several cells.

Genitalia: Female last ventral segment with posterior margin roundedly produced. The male connective is short and the aedeagus is more than three times as long. The base is narrow. At half its length it is enlarged abruptly and a short dorsal blunt spur is produced. Beyond this the apical portion is wider, and is cleft forming a dorsal narrow portion which is curved dorsally at apex and is blunt at tip. The ventral portion is wider, narrowed to form a pair of sharp pointed apices which extend beyond the dorsal curved portion.

Holotype male collected at Balsas, Guerrero, Mexico, August 15, 1936, by J. Parra. Allotype female from Finca Vergel, Chiapas, Mexico, May 19, 1935. Paratype males and females were collected at Balsas and at Iguala, September 11, 1939, by Dr. C. C. Plummer and the author at the same locality in October, 1941, by E. E. Good and the author. Paratypes are also at hand from Cocula, Huitziltepec, and Mezcala, all in the state of Guerrero, Mexico.

Osbornellus trimaculatus n. sp.

In form and general appearance resembling *acuminatus* but with distinct genitalia. Length 6 mm.

Vertex bluntly angled, slightly wider between eyes at base than median length.

Color: Vertex pale, marked with black and red. The dark markings are so arranged that there are several pale areas, composed of the ocelli, a small apical spot, a larger marginal spot each side between apex and ocelli, a triangular spot just above apex, and a smaller one either side located on an oblique line extending from base of triangular spot to eye. A reddish spot either side of middle between anterior margins of the eyes and a broad transverse pale band across base interrupted at middle by a black line. Pronotum brown with two dark brown spots surrounded by white behind each eye. Scutellum brown margined with white on each side except a small brown spot each side about one-third the distance from base. A pair of separated white spots on middle at base. Elytra brownish subhyaline, veins brown. Apical margins of elytra, a spot in discal cell, apices of claval veins and costal veinlets marked with dark brown.

Genitalia: Female last ventral segment strongly roundedly produced. Male connective almost as long as aedeagus. Aedeagus enlarged near narrow base and with a dorsally produced thumb-like process which is one-third as long as apical portion. Beyond this process the aedeagus is gradually narrowed and curved dorsally then anteriorly to form a narrow, blunt pointed apex. The pygofer on the ventral apical portion forms a long pointed spine which extends caudally.

Holotype male collected at Monte Grande, Chiapas, Mexico, March 23, 1931, by J. Parra. Allotype female and female paratypes from Chiltepec, Oaxaca, March 1932, and San Cristobal, Oaxaca, Mexico, March 1938.

Osbornellus salsus n. sp.

In general appearance resembling *scalaris* but with markings more distinct and male genitalia distinct. Length 4.5 mm.

Vertex narrow, bluntly angled but strongly produced, slightly wider between eyes at base than median length.

Color: Vertex pale with dark brown markings. A brown line just below vertex margin. A waved line arises next eye just back of ocellus on either side and extends to apex, thus forming a white margin between the brown lines and a white spot at apex with a larger one just above apex. An inverted white "T" divided in the middle by a brown line and bordered by a dark brown marginal line on base which forms a heavy, short, brown transverse bar just back of superapical white spot. Pronotum brown with pale and dark brown irregular spots along anterior margin. Scutellum pale with dark brown basal angles. Elytra subhyaline, veins brown, brownish spots at apex of each claval vein, a spot on discal cell, one on anterior cross vein and each of the costal veinlets.

Genitalia: Female last ventral segment strongly roundedly produced. Male plates long, slender, exceeding pygofer. Aedeagus in the shape of a hand with the narrow wrist portion attached to the connective. Beyond this it is enlarged forming a dorsal thumb which is directed caudally. The first finger is narrow at base and enlarged and broadened at apex. The second finger is broad at base and convexly curved ventrally to form a pointed apex. Just beneath this is a pair of long slender processes which extend more than half the length of the shorter processes beyond their apices.

Holotype male, allotype female and male and female paratypes from Iguala, Guerrero, Mexico, September 11, 1939, collected by Dr. C. C. Plummer and the author. Female paratypes from Juitepec, Morelos, Mexico, September 6, 1939, collected by Dr. Plummer and the author.

Osbornellus nigrocinctus n. sp.

In form and general appearance resembling *consors* but with markings on vertex more fused into an irregular band and with distinct male genitalia. Length 5.5 mm.

Vertex bluntly angled, distinctly wider between eyes than median length.

Color: Vertex pale with a dark brownish irregular band between ocelli. There are two slender oblique spurs that extend toward apex almost enclosing a pale spot and a shorter spur extends toward eyes on each side on posterior portion of band. Ocelli white. Pronotum brownish, with irregular white and dark brown spots on anterior border. Scutellum pale brown with a pale triangular spot about half way from base to apex on outer margin, either side. Elytra brownish subhyaline, veins dark brown, cells of clavus with milky white streaks. A large brown spot on middle of discal cell, a brown spot on each costal veinlet and apical margin brown. Face pale brown with pale arcs either side and a dark brown line just below margin of vertex.

Genitalia: Female last ventral segment with posterior margin roundedly produced. Male plates decidedly longer than pygofer. Aedeagus broad at base with a dorsally produced thick thumb-like process which is enlarged at apex and bears a short tooth on caudal margin. Main portion of aedeagus divided into three parallel portions which curve dorsally. The anterior portion is a broad blade which is decidedly longer than the second portion which is narrow and is only slightly separated from the blade. The third portion is narrow and is the shortest of the three.

Holotype male collected at Tamazunchale, San Luis Potosi, Mexico, November 15, 1938, by Dr. J. S. Caldwell. Allotype female and paratype females collected at Finca Vergel, Chiapas during May and June, 1935.

Osbornellus separatus n. sp.

In general appearance resembling *scalaris* but with a broad pale stripe extending from middle of apex to tip of scutellum. Male genitalia distinct. Length 5 mm.

Vertex bluntly angled, a little wider between eyes at base than median length.

Color: Vertex pale with a dark line just below ocelli and a waved line just above ocelli extending to apex and enclosing a white marginal band. A white triangular spot just above apex. Posterior two-thirds of vertex without dark markings. An orange-red blotch near either eye behind waved line shading to white on middle line and on basal third. Pronotum brown with central half pale. Scutellum white with brown basal angles. Elytra brownish subhyaline, veins brown, three white semicircular spots on clavus next commissural line. Costal veinlets, spots in discal and anteapical cells, and apical margin, brown.

Genitalia: Female last ventral segment strongly roundedly produced. Male aedeagus joined to a long rather narrow connective. The base is extended dorsally, forming a long, broad thumb-like structure which is convexly curved on the anterior margin. At the base of this process the aedeagus is cleft to form two long curved processes of about the same size which extend caudally, then curve dorsally extending beyond the dorsal margin of pygofer. These processes appear to be about parallel and the ventral one is divided into two distinct, somewhat divergent, portions at about half its length. Pygofer concavely indented on blunt apical portion.

Holotype male collected at Esmeralda, Chiapas, Mexico, November 18, 1930, by Dr. Alfons Dampf. Allotype female collected at Esperanza, Chiapas, Mexico, August 2, 1938, and male and female paratypes from Finca Vergel, Huixtle, and Esperanza, Chiapas, Mexico; Cuernavaca, Morelos, Mexico; Coatepeque, Guatemala; and Retalhuleu, Guatemala.

Osbornellus concentricus n. sp.

In form, coloration and general appearance resembling *scalaris,* but with distinct genitalia. Length 5 mm.

Vertex bluntly angled, a little wider between eyes at base than median length.

Color: Vertex pale with the submarginal and supermarginal black lines enclosing a pale margin. A pale spot just above apex, the inverted white "T" on the base of vertex margined with a brown border and orange spots between the base of the "T" and the anterior margins of the eyes. Proontum brown with numerous irregular pale and dark brown spots along anterior margin. Scutellum pale with dark brown basal angles. Elytra brownish subhyaline with dark brown veins. The three semicircular white spots on clavus along commissural line are not conspicuous.

Genitalia: Female last ventral segment rather strongly roundedly produced on posterior margin. Male aedeagus in general appearance resembling the aedeagus of *separatus.* The finger-like dorsally directed process at the base is more slender and constricted just before apex. The main portion is divided into two long slender pointed parallel processes. The ventral process unlike the ventral process of *separatus,* is a single shaft. The pygofer is blunt and rounded at apex.

Holotype male, allotype female and male and female paratypes collected at Tamazunchale, San Luis Potosi, Mexico, November 15, 1938, by Dr. J. S. Caldwell. Paratype male taken in the low country on the Acapulco Road November 22, 1938, by Dr. Caldwell.

Osbornellus spinosus n. sp.

In form, coloration and general appearance resembling *scalaris* but with a conspicuous spine on apex of pygofer and with distinct genitalia. Length 5.5 mm.

Vertex bluntly angled, slightly wider between eyes at base than median length.

Color: Vertex pale, markings similar to those of *scalaris.* A black line just below margin and a waved black line just above forming a small white spot at apex and an elongated white spot either side between ocelli and apical spot. A triangular white spot just above apical spot. A broad short black bar across base of the inverted "T" which covers the basal portion. An orange spot either side between base of inverted "T" and anterior portion of eye. Pronotum brown with light and dark spots along anterior margin. Scutellum brown with a white dash either side of basal angle and the apical margin bordered with white half way to base on either side. Elytra brownish subhyaline, veins dark brown, spots on apices of claval veins and costal veinlets brown.

Genitalia: Female last ventral segment rather broadly roundedly produced. Male pygofer with a long, sharp pointed spine extending caudally and ventrally from dorsal portion of apex. Aedeagus with a narrow base, a rather short, narrow dorsal process arising not far from base at the point where the aedeagus is enlarged dorsally and ventrally. Beyond it is gradually narrowed and curved dorsally to form a pointed apex. A short process arises not far from apex either side and extends a short distance but does not reach apex.

Holotype male collected at La Florida, Chiapas, Mexico, May 1931, by J. Parra, allotype female from Finca Vergel, Chiapas, Mexico, May 29, 1935, collected by Alfons Dampf, and male and female paratypes from both localities cited above and from Monte Alto, Veracruz, and Tuxtepec, Oaxaca, Mexico.

Osbornellus grandis n. sp.

Resembling *scalaris* in form, coloration and general appearance but with distinct genitalia. Length 5 mm.

Vertex bluntly angled, a little wider between eyes at base than median length.

Color: Similar to *spinosus* with the black submarginal line and a black supra marginal line enclosing the ocelli, a small spot at apex and an elongated spot either side which are white. A super apical white spot surrounded by a black margin, an orange spot either side next anterior portion of eye and the basal third white, margined with brown. Pronotum brown with pale and brown spots along anterior margin. Scutellum brown, a white dash on each side of basal angle and a white triangular spot on each side about half way between base and apex. Elytra brownish subhyaline, veins brown, a brown spot on apex of each claval vein, a spot on each costal veinlet, and apex of elytra brown margined.

Genitalia: Female last ventral segment roundedly produced on posterior margin. Aedeagus rather narrow in lateral view, a dorsal, rather thick process arising near base which is half as long as the apical portion and with a blunt apex. Apical half divided into three slender processes which are pointed at apex and are proximal for most of their length.

Holotype male, allotype female, and paratype males and females from Finca Vergel, Chiapas, Mexico, May 11–23, 1935, collected by Dr. Alfons Dampf. Paratype male collected at Tolosa, Oaxaca, January 2, 1932, by J. Parra.

Osbornellus reversus n. sp.

A pale species resembling *hyalinus* but with distinct male genitalia. Length 4.5–5 mm.

Vertex bluntly rounded, wider between eyes at base than median length.

Color: Pale yellow, scarcely marked. Veins on posterior portion of wing brown and usually anterior cross vein brown. Three pairs of brown spots along commissural line. A spot at the end of each claval vein and at tip of clavus. The central pair are usually the largest.

Genitalia: Female last ventral segment with posterior margin produced to form a blunt, rounded apex. Male aedeagus enlarged at base, where it joins with the connective. In lateral view it is rapidly narrowed beyond the enlargement to form a rather long, slender spine-like apex which extends caudally and curves slightly dorsally. At the base a dorsal process is attached to the enlarged portion. It is short, rather thick, and is in the form of a rather straight "S" which is reversed and the ends do not curve back sharply. The pygofer is tapered and bluntly pointed at apex.

Holotype male from Coatepec, Veracruz, Mexico, August 14, 1934. Allotype female collected at Finca Vergel, Chiapas, Mexico, May 20, 1935. Male and female paratypes from the same localities and from Esmeralda, Finca Maravillas, Monte Grande, Barra Honda, F. la Victoria, all in the State of Chiapas; and Chiltepec, Oaxaca, Mexico.

Osbornellus tumidus n. sp.

A small, blunt-headed species, in general appearance resembling *Xestocephalus tesselatus* because of the mottled color pattern. Length 4 mm.

Vertex bluntly angled, about one fourth wider between eyes at base than median length.

Color: Vertex pale with a brown line just below margin. A waved line above margin forming a white marginal band with enlarged portions either side of middle and an enclosed white super apical spot. Basal portion with two median elongated white stripes margined with brown. Pronotum brown with three pale spots on anterior margin at the center of each of which is a brown spot. Scutellum pale with darker basal angles. Elytra pale brownish subhyaline with dark brown spots. Claval veins pale, other venation dark brown. Spots at base of clavus, either side of commissural line, a spot on disc, costal and apical margins, dark brown.

Genitalia: Male plates short, not exceeding pygofer. The aedeagus is narrow in lateral view with a long dorsal spur near base which is more than half as long as the apical portion and is curved caudally at the apex. Beyond this the aedeagus curves slightly dorsally and is bent abruptly anteriorly forming a long, sharp pointed apical tooth which extends anteriorly. About half way between these two processes is a short tooth which curves anteriorly and dorsally.

Holotype male from Monte Grande, Chiapas, Mexico, March 23, 1931, collected by J. Parra.

MISCELLANEOUS BEHAVIORISTIC OBSERVATIONS UPON DIPTERA (CLUSIIDAE, CHLOROPIDAE, SCIOMYZIDAE).

By George Steyskal, Detroit, Michigan.

The following observations were made in the vicinity of the writer's home in Detroit, Michigan, in 1941.

Clusia czernyi Johnson (Clusiidae), June 7. Two males were standing on a section of tree trunk which had been standing under the trees for several years, during which time it had become quite decayed and covered on the sides with *Polyporus* bracket fungus. One of the flies was noticeably larger than the other. He very slowly and stealthily approached the other fly, who noticed him and turned to face him directly. When the two flies were about two centimeters apart they stood perfectly still for over a minute. Then the larger fly commenced to raise and lower the tip of his black abdomen together with his closed wings. The smaller fly responded in like fashion. After continuing thus for a short time the larger fly suddenly leaped upon the smaller and was next seen with the wings of his victim in the grasp of his strong fore legs. The victim managed to free his wings but one leg remained in the attacker's grasp. The leg was also soon freed and the fly escaped. *Clusia* *czernyi* was also found on several other rotten logs in the vicinity strutting about flashing its patterned wings from a closed to a half-open position. Except in the above instance the males would never allow another to approach very closely. A number of times males were seen to stand near females and flash their wings a few times but either the female would fly away or another male would interrupt, so that nothing further took place.

Chaetochlorops inquilina Coq. (Chloropidae), June 22. Little black flies were observed on the dry cap of a fungus about five feet from the ground on a badly fungus-infected plum tree near a burrow inhabited by a small solitary wasp. The male had a pair of black tubular protrusions at the end of the abdomen which were quite stout, almost the length of the abdomen and extended antero-laterally. The male faced the female and moved these protrusions (extensible sacs) a little in a forward and backward direction. After some difficulty and by returning to the spot several times a single male was finally captured, which was kindly determined by Curtis W. Sabrosky.

Sepedon pusillus Lw. (Sciomyzidae), July 13. A pair of *pusillus* were noticed *in copulo* on an arrowhead (*Sagittaria*) leaf on the banks of the River Rouge. Since arrowhead petioles are very weak it was possible to pluck the leaf without disturbing the flies and to observe them quite closely. The male was astride the female with his fore tarsi lying upon her parafrontals (on the top of the head just mesad of her eyes). His middle tarsi were stroking the sides of her thorax and his hind tarsi were slowly but continually stroking the lower side of the tip of her abdomen, which was well distended. I was able to watch them for perhaps half a minute before a gust of wind shook the leaf I was holding enough to scare them away.

New Record for Trichopepla pleyto Van Duzee (Heteroptera, Pentatomidae).—This species was described in 1921 by E. P. Van Duzee from California, and it does not appear to have been recorded from any other place. The locality following, seems to be new and widens the distribution of the insect. Mr. Owen Bryant secured three adults (two teneral) and one nymph of *Trichopepla pleyto* Van Duzee at Lake Tahoe, Nevada, August 8, 1936, elevation 8000 feet.—J. R. DE LA TORRE-BUENO, Tucson, Ariz.

A NEW PHILIPPINE LEPTOPODID WITH REMARKS ON THE CLASSIFICATION OF THE FAMILY (HEMIPTERA).

By Robert L. Usinger, University of California, Davis, Calif.

Since 1911, the classification of the Leptopodidae has remained essentially as Horváth left it.[1] Very few new species have come to light and these have not disturbed the picture. Unfortunately it now becomes necessary to revise our ideas regarding the *Erianotus-Valleriola-Martiniola* complex. While collecting on the island of Luzon in 1936 I took the first Leptopodids ever to be recorded from the Philippine archipelago. The species is remarkable in possessing an elongate subparallel body form, long third antennal segment, and a single series of short spines on the front tibiae as in the large oriental genus *Valleriola* Distant. However, the legs are glabrous and the front femora are armed with two rows of spines as in *Martiniola* Horváth and *Erianotus* Fieber. Of these it resembles *Erianotus* because the anterior tibiae have only a single series of spines, whereas the hemelytral venation is precisely as figured for the African *Martiniola*. Thus the Philippine species exhibits a reshuffling of generic characters and suggests that this complex may be a single monophyletic group of wide distribution in the old world. The new species has been assigned to *Erianotus* because this is the oldest name by 40 years. Mr. J. R. de la Torre-Bueno has very kindly read the manuscript and offered several suggestions.

Erianotus buenoi Usinger, new species.

Form elongate-oval with sides subparallel, slightly over three times as long as broad. Body sparsely clothed with long, erect, slightly curved hairs and a more or less distinct silvery "bloom." *Head* twice as broad across across eyes as long on median line, wider than pronotum and about as wide as body across hemelytra. *Eyes* exceedingly large, pedunculate, twice as wide as interocular space in front, three-fourths as wide as interocular space at middle, produced well in front of anterior margin of head, their inner margins broadly concave on anterior half and narrowly, deeply notched at posterior fourth. *Interocular space* deeply concave above and clothed with a fine, appressed pubescence with two glabrous areas just before level of

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[1] Horváth, G. 1911. Révision des Leptopodides. Ann. Mus. Nat. Hungarici, 9: 358–370. 5 figs.

anterior margins of eyes, a postmedian elevation bearing the closely approximate ocelli and a posteriorly divergent velvety area behind ocelli which joins the abruptly constricted and thence feebly convex velvety neck region; three erect curved bristles behind ocelli, one on either side of head near posterior constriction, another pair just beyond middle and a third pair in front of anterior glabrous areas. *Front* short, strongly declivous, longitudinally sulcate at middle, transversely carinate just before insertion of antennae; *clypeus* strongly bulbously elevated between antennal bases. *Bucculae* very large, scarcely longer than deep, open in front and closed behind. Under surface of head with three long, stout, curved spines on either side, labrum reaching only to tip of bucculae. *Rostrum* long and slender, the first segment longest, with two long curved spines on either side; second segment half as long as first, without stout spines; third segment one-third as long as first, slender, acuminate at tip. *Antennae* longer than body, 192 : : 185; proportion of segments one to four as 14 : 34 : 68 : 76; first segment thick at middle, attenuate at either end, second slender, cylindrical except for slight enlargement at apex, third and fourth long, filiform. *Pronotum* unarmed, one-fourth broader across humeri than long, about one-third longer than head on median line; convex above, transversely impressed subapically and about at middle, the front lobe thus formed being longitudinally impressed at middle, posterior lobe depressed at humeri; lateral margins sinuately carinate, curved and laterally flattened at humeri; disk sparsely, regularly covered with large, shallow punctures except on elevated portions of anterior lobe, sparsely beset with long, curved bristles, posterior margin scarcely arcuate and feebly sinuate at basal angles of scutellum. *Scutellum* about as long as broad, roundly elevated laterally with a large cordate depression at middle; acute at depressed apex and provided with erect bristles. *Hemelytra* exceeding tip of abdomen by about one-third their length; costal margins subparallel at basal fourth, slightly widened before middle and then arcuately converging towards apex; inner margins of clavi strongly sinuate around scutellum; main corial vein branching to form two apical cells in the corium but without a cross-connection to costal margin; clavus and corium with scattered bristles mostly along veins, the costal margin smooth, with a few short erect hairs just within the edge; corium impunctate except unevenly laterad of main vein at base; clavus with a row of punctures along claval vein and ill-defined punctures marginally at base. *Under surface* mostly shining and clothed with a short, erect pubescence and propleura and front of prosternum duller and coarsely punctate; intercoxal portion of prosternum finely granular; front acetabula large, indistinctly punctate, with a single, anteriorly directed spine on each; mesosternum longitudinally impressed on posterior half; metasternum narrow, depressed basally and roundly elevated posteriorly, ostiolar openings velvety on either side behind intermediate acetabula and below bases of hemelytra; abdomen subflattened beneath, much narrower than hemelytra. *Coxae* elongate, rotatory, the front pair longest, beset with several long, slender spines at base and apex, the trochanters likewise spiny. Front femora about as long as third antennal segment, thick at base, attenuated apically, bearing two rows of short, peg-like spines on inner face with three long, stout spines along basal half of outer row and two along inner row apically, the one near middle set somewhat off the main row. Front tibiae less than one-fourth shorter than femora, slender and nearly cylindrical with a single row of short, apically directed spines along inner face. Front legs clothed with irregular fine erect hairs. Middle and hind legs without spines or bristles and only very sparsely clothed with short erect hairs. Middle femora slightly longer and hind femora much longer than front femora, less thickened basally and very slender apically. Middle tibiae about as long as femora, hind tibiae much longer than femora. All tarsi slender, three-segmented, clothed with a short pubescence.

Color black, with ochraceous deflected apex of head, dull post-ocellar region before neck, posterior margin of pronotum, apex of scutellum, a stripe along middle of corium and along main vein. Costal margins white. Under surface with white bucculae, rostral spines and legs, except for occasional fuscous marks on anterior femora; middle and hind tibial spines brown or black. Posterior margins of abdominal segments three to five white. Eyes silvery. Antennae and rostrum brownish ferrugineous, the basal antennal segments pale below. Upper surface of pronotum, clavus and corium more or less silvery pubescent or plumbeous velvety with a particularly conspicuous spot on each corium at middle of outer discal, and at base of outer apical, closed cell.

Size: length 4.8 mm., width (hemelytra) 1.2 mm.

Holotype, No. 5220, Calif. Acad. Sci., Ent., Montalban, Laguna

Prov., Luzon, P. I., July 24, 1936, R. L. Usinger collector. Two paratypes, same data as the type, one in my collection and one in the collection of Mr. J. R. de la Torre-Bueno, for whom the species is named in appreciation of his assistance in loaning valuable Leptopodid material from other parts of the world.

MATING OF THE HORSEFLY, TABANUS METABOLUS.

By Cornelius B. Philip, Hamilton, Mont.

Although the activities of non-biting males of various species of horseflies (family Tabanidae) have often been recorded, actual copulation has been seen so rarely it appears worth-while to record an experience of the writer with *Tabanus metabolus* McD. While kneeling in the yard of my home in Hamilton, Mont., about 10:15 A.M., May 1, 1940, my attention was attracted by the familiar buzz of a horsefly and I looked up just in time to see 2 flies meet in mid-air about 3 feet off the ground and about the same distance in front of my eyes thus providing a good "ringside seat" for a performance few tabanid students ever get to see. After a moment's hovering during which coupling was effected, the female flew awkwardly to alight on a nearby bush with the male hanging inertly beneath, in which position they remained until their capture was effected.

During this and the succeeding 2 days, other males were seen to be hovering in various places on the East and South sides of my own and a neighbor's houses, usually over the lawn near some projecting branches of foundation bushes; 14 of these were netted. Three other pairs were also taken resting in the bushes, the males always suspended inertly beneath without grasping the perch on which the female was resting, but none were again seen to unite in the air. Hovering was discontinued each day just before noon, and was not resumed on the fourth or following mornings although there was no change in the bright warm weather. The species is one of the earliest on the wing in the Bitterroot Valley, but is seldom seen even about stock on the Valley floor, which together with the fact there are no obvious open-water breeding places within a half a mile of this location, leads to some wonder with regard to breeding places of this species. There are some points in common with the records of mating of *T. phaenops* observed by Webb and Wells in 1924 near Topaz, Calif.

FOUR NEW SPECIES OF WHITE-FRINGED BEETLES (SUBGENUS GRAPHOGNATHUS) FROM THE SOUTHEASTERN PART OF THE UNITED STATES (COLEOPTERA: CURCULIONIDAE).

By L. L. Buchanan, Washington, D. C.

The following short descriptions are published now so that certain species of weevils can be referred to by name in entomological reports. More complete data, with keys and figures, are to be published later. All four species are considered to be accidental introductions from South America.

Pantomorus (Graphognathus) minor, n. sp.

> Length 6.5–10.5 mm. Stout, light to dark slaty gray, often with tan or brown cast; eyes feebly convex; rostral portion of median groove on dorsum of head carinate; disk of pronotum usually subplanate longitudinally, and with prostrate or nearly prostrate vestiture; elytra with discal striae not impressed, inconspicuous, the erect setae a little longer than in *peregrinus,* but shorter than in the other species; corbel plate well developed. About 230 specimens examined.

Type locality.—Florida (Pensacola).

Type.—Catalogue No. 56306, United States National Museum, a female dated August 1, 1941.

Distribution in United States.—Florida: Pensacola; Gonzalez; Cantonment; Bluff Springs; Century; Crestview.

This well-defined species is nearest *leucoloma,* but in the latter the median groove on the rostrum is not carinate, the erect elytral setae are longer, the strial lines on the elytra are more distinct, and the corbel plate is absent. No specimens of *minor* have yet been seen from South America.

Pantomorus (Graphognathus) pilosus, n. sp.

> Length 8–11.3 mm. Light to rather dark gray-brown, sometimes brown, usually with slight, almost brassy sheen; rostral portion of median groove either noncarinate or feebly carinate, marginal carina conspicuous; scutellum feebly or not impressed; elytral scales subevenly distributed on disk of elytra and obscuring the strial rows, the surface typically appearing rather smooth and even, erect setae longer and finer than usual; corbel plate obsolescent. About 32 specimens examined.

Type locality.—Alabama (Repton).

Type.—Catalogue No. 56305, United States National Museum, a female dated July 12, 1941.

Distribution in United States.—Alabama: Repton and vicinity; 3 miles east of Monroeville; near Drewry; Conecuh County; 2 miles north of Peterman.

Pantomorus pilosus is related to *striatus* and *dubius,* differing from them in its shinier derm, more feebly or noncarinate rostral groove, evener coating of scales on elytra, and longer and finer erect setae on elytra. No South American specimens definitely referable to *pilosus* have been seen, though there are at hand 9 individuals from San Antonio de Areco, Argentina, which belong to an extremely close relative.

Pantomorus (Graphognathus) striatus, n. sp.

> Length 9–12.7 mm. Light grayish brown to almost fuscous; rostral portion of median groove carinate; setae on disk of pronotum more nearly erect, and more "bristly" in appearance than in other species; scutellum usually impressed longitudinally; elytra often distinctly widened posteriorly, the interspaces more densely scaly than the strial rows, the latter typically appearing as narrow dark lines which are more conspicuous than in either *pilosus* or *dubius;* metasternum convex; corbel plate obsolescent to moderately developed, though never so well developed as in *minor.* At least 1,000 specimens examined.

Type locality.—Louisiana (New Orleans).

Type.—Catalogue No. 56307, United States National Museum, a female dated July 5, 1939.

Distribution in United States.—(The paratype series is restricted to specimens from New Orleans and vicinity.) LOUISIANA: New Orleans; near Barataria; near Fort Pike; Avery Island; Dalcour; Poydras; Violet; Jesuit Bend; Baton Rouge; Covington and vicinity; Marrero; Chalmette. MISSISSIPPI: Laurel; Bolton; Purvis; Carriere; Gulfport; Moss Point. ALABAMA: Grand Bay. FLORIDA: Pensacola.

In addition, 3 or 4 specimens from Irvington, Ala., are tentatively placed with *striatus.*

This extremely variable species differs from its nearest relatives in the United States (*pilosus* and *dubius*) by the following character combination, each statement, it is understood, being qualified by "usually": Distinctly carinate rostral groove, the more nearly erect pronotal setae, the impressed scutellum, the more widened elytra, the more distinct strial lines, and the convex metasternum.

A specimen from Cordoba, Argentina, in the National Museum collection is considered to belong to *striatus,* and several from other South American localities are referred doubtfully to the same species, as follows: San Juan, Argentina (4); San Antonio de Areco, Argentina (1); Montevideo, Uruguay (2).

Pantomorus (Graphognathus) dubius, n. sp.

> Length 8.5–12.2 mm. Pale gray-brown to subfuscous, the general hue duller than, and not so brown as, in *striatus;* rostral portion of median groove carinate; pronotum usually a little broader, relatively, than in *striatus* and pronotal setae more strongly inclined; scutellum usually impressed longitudinally; elytra less widened posteriorly than in *striatus,* scales on interspaces 2 and 4 rather frequently a little paler than scales on adjacent surface, and forming feeble, pale vittae; metasternum subplanate to broadly convex, averaging less convex than in *striatus.* About 151 specimens studied.

Type locality.—Alabama (Mobile).

Type.—Catalogue No. 56308, United States National Museum, a female dated June 21, 1940.

Distribution in United States.—ALABAMA: Mobile; Toulminville; Blakeley Island; Crichton; Prichard; Irvington; Buena Vista; Martin's Station; Tunnel Springs; 3 miles southwest of Peterman; 2 miles west of Natchez. (Paratype series restricted to specimens from first five localities.) MISSISSIPPI: Maxie.

In addition, the following 9 specimens are referred, though with doubt, to *dubius:* Neenah, Ala. (5); Watson, Ala. (1); 4 miles north of Nadawah, Ala. (1); Moss Point, Miss. (1); Gulfport, Miss. (1).

Pantomorus dubius is very close to *striatus,* but differs in its more strongly inclined pronotal setae, less widened elytra, less convex metasternum, and the not infrequent presence of vittae on elytral interspaces 2 and 4.

Among the South American specimens examined are several which, though not quite like any of the *dubius* specimens from the United States, may belong to this form. They are from the following places: Buenos Aires, Argentina; Montevideo, Uruguay; Paysandú, Uruguay.

KEY TO SPECIES OF GRAPHOGNATHUS NOW PRESENT IN THE UNITED STATES.

1. Scales along posterior half of median line of pronotum directed posteriorly; strial rows of elytra largely obscured by the

dense scaly coating; corbel plate well developed [Present at a dozen or more places in Mississippi; also at Grand Bay and Mobile, Ala.] .... *peregrinus* Buch.

Scales along median line of pronotum throughout directed anteriorly (except at apex and sometimes in a spot which usually is about middle); corbel plate not well developed except in *minor* 2

2. Corbel plate well developed; vestiture on disk of pronotum prostrate or nearly so; rostral portion of median groove carinate **minor** Buch.

Corbel plate absent or present as a vaguely defined, narrow space; setae (*i.e.*, the more slender type of vestiture) on pronotal disk slanting (more nearly prostrate in *leucoloma*, in which species the rostral portion of the median groove is not carinate); rostral portion of median groove carinate or not carinate 3

3. Color lighter, usually gray or gray with indistinct brownish mottlings; rostral portion of median groove wider, shallower, not carinate; prothorax relatively wider, in the proportion of 13 or more to 10; metasternum nearly flat to broadly convex [Found chiefly in Alabama and Florida, to a lesser extent in Mississippi and Louisiana] .... *leucoloma* Boh.

Color darker, usually brown or brownish gray; rostral portion of median groove deeper, carinate (sometimes not carinate in *pilosus*, in which species the prothorax is more elongate and the metasternum more convex); prothorax usually narrower relatively; metasternum more strongly convex (except in *dubius*, which has the rostral groove carinate) . 4

4. Scales on disk of elytra subevenly distributed in most specimens so as to obscure the strial rows; erect elytral setae longer and finer; rostral portion of median groove either noncarinate or with a feeble carina that is obviously feebler than the average carina in either of the next two species ...... **pilosus** Buch.

Scales on disk of elytra often more condensed on the interspaces than on the strial rows, the latter appearing as narrow, dark lines; erect elytral setae coarser and stiffer; rostral portion of median groove distinctly carinate 5

5. Elytral interspaces 2 and 4 scarcely ever vittate; elytra more widened posteriorly; metasternum more convex **striatus** Buch.

Elytral interspaces 2 and 4 rather frequently paler, though the vittae thus formed are usually feeble; elytra less widened posteriorly; metasternum less convex ...... **dubius** Buch.

ANNOUNCEMENT.

To Our Contributors and Readers.

It is known to all what conditions country-wide are. We do not dwell on this, except to point out that our Society is in no way exempt from the general misfortunes. Our publications, accordingly, must prepare to meet the dark future by the most rigid economies in every way. Heretofore, we have been generous in every possible way. Now, we must for the time being restrict the length and nature of articles accepted for publication. We had already arrived at one of these restrictions before the sad loss of our Treasurer—that is, to publish NO faunal or distributional lists until conditions improve. We will also restrict papers to a length of *not more* than 10 printed pages in length, which is roughly 15 typed pages, double space, except for such as may have been *accepted* before this notice appears.

We have also, and very regretfully, come to the decision to publish NO plates or figures, unless the cost of the plates is defrayed by the author. We make exception of those on hand and accepted, although we hope their authors may see their way clear to cooperating with us on this point.

Your Publication Committee feels that since heretofore we have operated within our income, we must now continue to do this if we are to survive. It is impossible to count on or expect individual contributions to help our finances. Everyone has staggering taxes and mounting expenses to meet, which leaves but little even for current personal obligations.

We ask our contributors and our readers to gird their loins for the future, which is none too glowing; and to cooperate with our Society by being patient with our forced shortcomings. We shall do all possible to maintain our standards of publication, but we are "in the fell clutch of circumstance" and must do what we cannot avoid or overcome.

The Publication Committee
of the Brooklyn Entomological Society.
Edwin Way Teale
Albro T. Gaul
J. R. de la Torre-Bueno

BOOK NOTES.

College Entomology, by E. O. Essig. Pp. i–vii and 1–900; figures 1–208. (The Macmillan Company, New York. 1942. $5.00.)

In noting this most recent work on general entomology, a comparison emerges between it and two other works of the same nature—Comstock's famous "Manual," and Metcalf & Flint's "Destructive and Useful Insects." Dr. Essig's work may in time take the place of Comstock as a text; but it might seem that it and Metcalf & Flint are complementary to each other, and on a different plan.

In the matter of classification, some changes are made in the work discussed, but since there is a fluidity in the arrangement and boundaries of the major insect groups, this is to be expected, and, indeed, welcomed. At least, it brings divergent views into the open for discussion; which is very necessary, unless every scientific pronouncement is to be viewed as a static perfect crystal, unalterable and final. All science is like π—as time goes on and it is carried further and further, it approaches closer and closer to the infinite unchangeable truth.

Dr. Essig's many figures are mostly fine line drawings, which tell their stories very definitely and very clearly.

The writer is incapable of indiscriminate praise, so here are one or two matters which may be modified toward perfection in later editions, of which we hope there will be many. One of these is the typographical errors here and there in names. How these get by the many readings technical proof has is one of those mysteries. And the author has our sympathy (if he wants it).

The other, in the writer's idea, is the more important. Each chapter, or family, has a list of "Selected References." Here we come into matters of judgment. But let us take as an example those on the Heteroptera. Champion's volume on Heteroptera, in Biologia Centrali Americana, is mentioned, but Distant's is omitted. Why include Evans on Ambush Bugs, and omit Hungerford on Notonectidae, Nepidae and Hydrometridae, not to mention the writer on American Hydrometridae? McAtee & Malloch's important paper on Ploiariinae is mentioned, but their equally, or more, important work on Thyreocorinae is not cited. None of H. G. Barber's informing contributions on Lygaeidae appear. Blatchley's Heteroptera of Eastern North America is left out, although his Orthoptera of Indiana is given. And my own extensive

Synopsis of the Heteroptera does not appear. In the Coleoptera, we notice an outstanding omission—Böving & Craighead's Larvae of Coleoptera, which takes in all the matter in Böving's two short papers cited, and which gives over 2000 figures. In the Hymenoptera several important papers by Bequaert are not mentioned. And in the Homoptera, there is not a single reference to William T. Davis's work on the Cicadidae.

It may be, of course, that the references are purely taxonomic. But the greater part of those absent *are* taxonomic.

Naturally, an author of a general text cannot be expected to be familiar with all the family minutiae, but certainly there are at hand any number of eager coadjutors in any given group.

However, all this comment practically is "gilding refined gold," because *College Entomology* as it stands is a most useful and splendid work, and will doubtless enjoy the vogue it fully merits.

In connection with these "Book Notes," the writer (and Editor) here states *positively* that that is all they are meant to be—merely notes. Their only end is to make known to our readers the works we mention in them, and to point out a little about them. The "Notes" are not meant to be extended reviews nor yet minute critiques. The work mentioned here deserves a critical study by those fully competent to discuss each heading. A careful evaluation of any one chapter would call for a consensus of a number of experts, which is practically impossible and not of great moment in the matter of a college text.

And our "Book Notes" are too brief and our space too scanty to be so extended. J. R. T.-B.

Foodplant of Corimelaena extensa Uhler. This species is probably the most common and abundant Thyreocorine about Tucson, Ariz. It is found ordinarily in large numbers on Tree Tobacco (*Nicotiana glauca* Graham) and on another low-growing wild tobacco (*Nicotiana trigonophylla* Dunal). It has also been found on a *Pentstemon* growing under a tree-tobacco plant, probably accidental. The bug is found almost anywhere on the plants, but especially in the flowers, head down in the calyces; and at other times inside the seed capsules. My notes show it only from April to June, apparently starting to breed in the latter month. The times of occurrence given merely indicate that it has not been sought for in other months.—J. R. DE LA TORRE-BUENO, Tucson, Ariz.

PROCEEDINGS OF THE SOCIETY.

Meeting of March 12, 1942.

A regular meeting of the Brooklyn Entomological Society was held at the Brooklyn Museum on March 12, 1942. President Wm. T. Davis called the meeting to order at 8:15 P.M. Members present included Edwin W. Teale, R. R. McElvare, Fred T. Naumann, Otto Buchholz, G. P. Engelhardt, A. T. Gaul and Wm. T. Davis. Visitors were Dr. and Mrs. C. J. Goodnight.

Mr. Engelhardt remarked that volumes 1–7 of our Bulletin were getting scarce and that they would be repurchased gladly as they are out of print. He also reported the death of Dr. H. P. Löding the noted coleopterist of Mobile, Ala., who died on February 25 last at the age of 72.

Mr. Davis displayed a new variety of *Diceroprocta semicincta* from the Chiricahua Mountains in Arizona. This variety has small opercula, concolorous black dorsum and narrow eyes.

Dr. Clarence J. Goodnight spoke on "Studies on Phalangida."

The Phalangids are also known as "Daddy-Long-Legs," "Harvestmen" and "Harvest Spinners." Very little work has been done on them from both the taxonomic and biological aspects. Phalangids are distributed throughout the Western Hemisphere. They are Arachnida and therefore have 4 pairs of legs, a cephalothorax, terrestrial breathing apparatus (tracheae), and no antennae. Other Arachnids include the Scorpions, Solpugids, Spiders, Mites and Ticks.

Phalangids have a segmented abdomen, and are therefore regarded as more primitive than the spiders and other groups.

Some of the more important taxonomic characters are, the spination of the eye tubercles, the dorsum, the length and spination of the legs, the character of the chelicerae.

The abdomen is usually composed of ten segments. The mouth is formed by the upper and lower lips and the epipharynx. The internal anatomy of phalangids is very similar to the spiders. They possess the haemocoele type of body. They have very distinct scent glands. Respiration is accomplished through two spiracles located between the cephalothorax and the abdomen. The reproductive organs are in the ventral area of the cephalothorax, and must be dissected to determine the sex of any specimen. The nervous system is similar to that of insects and spiders. The alimentary tract ramifies through the body and thus enlarges the absorptive areas.

The habits of the phalangids are very little known. Some of our northern species have long legs and can withstand very dry environment. Many of the smaller groups, particularly the tropical species depend upon a high degree of moisture. Many species are gregarious. The young phalangids are very similar in appearance to the adults; however no single life history is fully known. Few individuals can survive the winter, although some cases of survival are on record. The eggs however survive regularly and adults are produced in June in the New York climate. As far as is known, phalangids eat only dead animal foods.

One primitive group are very tiny mite-like species. Dr. Goodnight concluded his interesting lecture with a discussion of several important groups of phalangids and exhibited some specimens.

The meeting adjourned at 10:10 P.M.

A. T. Gaul,
Secretary.

EXCHANGES

This one page is intended only for wants and exchanges, not for advertisements of articles for sale. Notices not exceeding THREE lines free to subscribers. Over lines charged for at 15 cents per line per insertion.

Old notices will be discontinued as space for new ones is needed.

DIURNAL LEPIDOPTERA.—Have many desirable western species to exchange, including *Argynnis atossa, macaria, mormonia, malcolmi, nokomis; Melitaea neumoegeni; Lycaena speciosa;* etc. Send lists. Dr. John A. Comstock, Los Angeles Museum, Exposition Park, Los Angeles, Calif.

BUY OR EXCHANGE: Pinned Microlepidoptera and papered Pieridae of North America. Full data with all specimens. Named material of all groups offered. Alexander B. Klots, College of the City of New York, New York City.

PENTATOMIDAE: Want to buy or exchange Petatomidae from the United States and Mexico. Herbert Ruckes, College of the City of New York, 17 Lexington Ave. N.Y.C.

ACALYPTRATE DIPTERA OF THE WORLD wanted for determination or in exchange for other insects. Geo. Steyskal, 23341 Puritan Ave., Detroit, Mich.

LEPIDOPTERA COLLECTION.—Excellent condition, fine representation of named N. A. Diurnals and Nocturnals. Also choice selections of tropical Papilios, Sphingiids and Saturniids. Hy. J. Dietz, 3053 Hull Ave., New York, N. Y.

WANTED.—Living colonies of Vespine wasps. Buy or exchange in other orders. A. T. Gaul, 401 Washington Ave., Brooklyn, N. Y.

WANTED.—MANTID EGG CASES from West of the Mississippi River. If interested in collecting, write: Osmond P. Breland, The University of Texas, Austin, Texas.

INTERESTED IN AEGERIIDAE: would like to buy or exchange for these. Also interested in beetles, moths and butterflies of the world. R. E. Griffin, 4514 S.E. 18th Ave., Portland, Oreg.

WILL PURCHASE complete sets of the BULLETIN, Old Series, Vols. 1–7, 1878–1885. Brooklyn Entomological Society, Ivy Way, Port Washington, L. I., N. Y.

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ALBRO T. GAUL EDWIN W. TEALE

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The Brooklyn Entomological Society

Meetings are held on the second Thursday after the first Tuesday of each month from October to June, inclusive, at the Central Museum, Eastern Parkway and Washington Ave., Brooklyn. The annual dues are $2.00.

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311 East 4th St., Tucson, Ariz.

BULLETIN
OF THE
BROOKLYN ENTOMOLOGICAL SOCIETY

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TO WILLIAM T. DAVIS.

Eighty Years Young

Age is a creation of the mind. There are men born with the seed of senility deep in their consciousness. In such men, this seed of age developes, flourishes, and bears its fruit, a hard, unchanging bitter nut, a nut which lives and dies, incapable of adapting itself to circumstance and change.

Not so was born William Thompson Davis. His spirit had in it the seed of ever-living youth, a seed that has flourished and grown and bloomed through the years; a seed which has burgeoned into a plant which still brings forth abundantly; and which still bears sweet fruits to delight his friends.

We whose years are less than his, even though past the span alloted by the Psalmist, consider, admire, and hope.

We consider the trials and griefs of life he has met with constant strength. We admire the innumerable fruits of his busy years, years in which he has formed himself into our greatest American naturalist of the generation that is so rapidly passing.

And we hope that those of us who reach his happy age will rejoice in as many loving friends, and no ill-wishers, as our dear friend to whom we offer this tribute, William Thompson Davis.

To him we dedicate this number of our Bulletin, in testimony of deep affection and of our recognition of what he has done and of what he has stood for in our lives.

J. R. de la Torre-Bueno

OCT 9 1942

WILLIAM T. DAVIS—

An Appreciation.

By Edwin Way Teale, Baldwin, L. I., N. Y.

William T. Davis in Action.

The twelfth of October is Columbus Day. This year, for hundreds of friends of William T. Davis, the beloved Staten Island naturalist and long-time president of the Brooklyn Entomological Society, it is also Davis Day. For, on October 12, 1942, William T. Davis celebrates his eightieth birthday.

For four-score years, he has enjoyed the pursuit of natural history within sight of the skyscrapers of Manhattan. Exploring at home, he has made important additions to the knowledge of science. Surroundings which others might have considered commonplace have been endlessly exciting and fruitful for him.

All his life, he has lived within 200 feet of the spot where he was born. Except for trips afield, he has occupied the same house, slept in the same iron bed, eaten at the same table, year after year. And, all the while, ships from the seven seas have sailed past his doorstep up the roadstead of New York Harbor. On board were restless men, wanderers who had seen far shores and strange people. However, it is doubtful if any of these far-ranging voyagers, haunted by wanderlust, found in distant places more of interest, of fascination, of content, than William T. Davis discovered at home.

Somewhere in the writings of the Concord essayist and philosopher, Ralph Waldo Emerson, there is the observation that eventually every community will have its Town Naturalist, just as it now has its local doctor and lawyer. This man, Emerson predicted, would answer questions about the stars, the plants, the trees, the birds, the animals, and the insects. And he would be paid a regular fee for his information, just as a client pays his lawyer or a patient his doctor.

Outside of the fact that he undoubtedly would insist on giving away his information free, William T. Davis comes nearer than any other man I know to meeting the qualifications of the ideal Town Naturalist that Emerson had in mind. His enthusiasm is contagious. His information is accurate. His interests cover the whole range of the out-of-doors.

Always he has been introducing boys to Nature. One youngster he met was interested in bird photography. Mr. Davis bought him his first camera. Later, the boy became the noted wildlife lecturer, Howard Cleaves. Another "Davis Boy," Alanson Skinner, developed into an anthropologist and authority on the American Indian. A third youngster, whom he first met climbing through a fence, is now known as the distinguished African explorer and ornithologist, Dr. James P. Chapin, of the American Museum of Natural History.

Among the "D's" in the latest volume of *American Men of Science,* you will find the following entry:

Davis, W(illiam) T(hompson), 146 Stuyvesant Place, Staten Island, N. Y. *Entomology, Botany.* Staten Island, N. Y, Oct. 12, 62. Private schs. A.A; fel. Entom. Soc; N. Y. Entom. Soc. (treas, 04–28, pres, 29, 30); Linnaean Soc. N. Y; fel. N. Y. Acad; Brooklyn Entom. Soc. (pres, 12–16, 20–); Staten Island Inst. Arts and Sci. (v. pres, 05–29, pres, 30–34, emer. pres, 34–); Entom. Soc. Wash; Acad. Nat. Sci. Phila; Boston Soc. Nat. Hist; Staten Island Hist. Soc. (pres, 22–). Cicadas of North America.

This concise résumé of his interests and activities suggests the breadth of his influence. But it gives no inkling of the flavor and inimitable charm of his personality or the stimulating freshness of his outlook. His kindness, his tact, his individuality, his ingenuity, all have become legendary. In an age of specialization, William T. Davis is one of the few remaining members of that select and glorious band of former years—the men who could rightly be classed as all-around naturalists.

The Civil War was exactly to the day one and a half years old when William Thompson Davis was born on October 12, 1862, at New Brighton—now Saint George—Staten Island. He was the son of George B. and Elizabeth (Thompson) Davis. His ancestors had settled early in Massachusetts and on Staten Island.

In 1877, while he was still a schoolboy, he first became interested in the cicadas. That summer, seventeen-year "locusts" emerged from the ground on Staten Island. They were descendants of the very brood Henry D. Thoreau had observed near the spot in 1843. The glinting wings, the fiery eyes, the vast noise and confusion of the insect hordes made a lasting impression on the boy. More than sixty years of study, since that day, have made him the outstanding authority on these strange insects of the New World. They also have given him a host of pleasant memories. In the latest of many papers on the cicadas, published in June of this year, he pays tribute to these insect friends of his in the following manner:

"Old Man Davis wishes to express his gratitude to the beautiful, sweet-singing family Cicadidae for helping him reach old age pleasantly 'mid the perplexities of this mysterious world."

After graduating from school, he embarked on a business career, becoming a clerk in a New York mercantile house. A few years later, he was offered a position in the Gratuity Fund Department of the New York Produce Exchange. Here, he remained for more than twenty-six years. During the last three years of this period, he was in charge of the department and responsible only to the

Board of Trustees. On November 7, 1900, he married Bertha Mary Fillingham, of Livingston, Staten Island. A little more than a year after the marriage, Mrs. Davis passed away on December 7, 1901.

Eight years afterwards, Mr. Davis retired from business to devote himself to the study of natural history. Already his remarkable friendship with Charles W. Leng was of long standing. For more than sixty years, these two amateur naturalists remained inseparable companions. They saw each other almost every day in the year. They worked together and played together and spent every possible moment together out in the open fields and woods. Together they hunted beetles and cicadas and together they made observations of value to science. In 1920, Mr. Leng's famous *Catalogue of the Coleoptera of America, North of Mexico,* appeared from the press.

Other projects were undertaken during their rambles afield. Together they produced the monumental five-volume *History of Staten Island and its People,* covering the period between 1609 and 1933. This thorough and painstaking task consumed the spare hours of several years. During weekends, they carefully copied inscriptions from thousands of old tombstones in early Staten Island cemeteries. By tracing back the history of plots of ground to original grants, they were able to give a picture of consecutive developments in various parts of the island. Mr. Davis is a life member of the New York Historical Society and was for sixteen years, from 1922 to 1938, President of the Staten Island Historical Society. Since 1938, he has been President Emeritus. Historical writings of his —such as *Staten Island Names, Ye Olde Names and Nicknames, Homestead Graves, The Conference or Billopp House,* and *History of the Staten Island Historical Society*—have been published by the organization.

When Mr. Davis was only nineteen years old and Mr. Leng was twenty-one, they—together with other young enthusiasts—formed the Staten Island Institute of Arts and Sciences. The first meeting, on November 12, 1881, was held at the home of Mr. Davis' maternal grandmother, Mrs. John C. Thompson. Among the fourteen young naturalists who attended this initial meeting were Arthur Hollick, who later became a well-known botanist, and Nathaniel Lord Britton, who eventually became the first Director of the New York Botanical Garden.

From this beginning, the organization grew through the years. The original membership of fourteen has increased until today the institute and its affiliated organizations have a membership which numbers nearly 1,000. Annual attendance at lectures and programs has risen from a handful in 1881 to more than 45,000 at the present time. The Staten Island Museum, which operates under the auspices of the Institute and with which Mr. Davis has been connected since its inception, now has more than 100,000 specimens of scientific, historic, and artistic significance. Its library holds more than 7,500 volumes. The first issue of the *Proceedings of the Natural Science Association of Staten Island* appeared in November 1883. The publication, with the title changed when the name of the association was altered, has appeared regularly for more than sixty years. It provides a valuable local record.

The close association between William T. Davis and Charles W. Leng lasted until the latter's death in 1941. These decades of continual cooperation were unmarred by discord. Both were sincere, kindly, conciliatory. And both were intensely interested in all the phases of the natural world around them.

On trips afield they would become as absorbed in watching birds or in studying plants as in the pursuit of entomology. Discoveries which Mr. Davis has made range through many fields. He was the first scientist to report that the sex of land tortoises can be determined by the color of their eyes. Females have dark eyes; males reddish eyes. He discovered a new type of hybrid oak which he named *Quercus Brittoni* in honor of his early friend, Nathaniel L. Britton. He noticed that luna moths in the vicinity of New York City have reddish margins along the rear of their wings when they emerge before June 1st and lack these markings when they emerge at a later date. He recorded the first cornsnake found in the state of New Jersey. He discovered and named the curious Eastern walking stick, *Manomera atlantica,* a species in which no male has ever been discovered. At other times, he has added new species of dragonflies and long-horned grasshoppers to the lists of science.

But his main interest through the years has been the cicadas. In the spring of 1940, I spent an unforgettable day with him watching the emerging millions of a brood of seventeen-year cicadas in the Half Way Hollow Hills region of central Long Island. In spite of his seventy-eight years, he was like a boy on a picnic. His heavy canvas knapsack was stuffed with tin boxes and olive jars for collecting specimens. His black net, then in its second decade of use, was tucked up under his coat, behind his shoulders. He referred to the circular bulge it made as his "spiral spine." When he saw a desired insect, he could whip out the net, push it in place on the handle—which had been serving as a cane—and run like a deer across the ground.

In an orchard hayfield below a white farmhouse on a hill, we found cicada hordes so vast we had to shout to make each other hear. Every stalk of timothy seemed to bend beneath a burden of shrilling insects. Brown windrows of empty nymphal skins lay over the bare ground beneath the apple trees and the flutter of wings among the foliage produced a continual sound like rain on leaves. Cicadas alighted on Mr. Davis' straw hat. They swirled around him. He moved as in a cloud. For him, time stood still while he revelled in the beauty of the yellow-veined fiery-eyed host; in the glinting, fluttering flight of the insects, in their mating and singing and egg-laying. Lunchtime was ignored. He was lost in the recurring drama of the periodical cicada. His enthusiasm was contagious. His love of the cicadas is one of those sincere and steadfast passions which endure for a lifetime.

Out of approximately 170 cicadas from North America known to science, William T. Davis has named and described more than 100. The oldest fossil cicada ever found has been named in his honor. Oxford University and other venerable institutions of learning abroad have sent him specimens to study and identify. His cicada collection at the Staten Island Museum is one of the most complete in the country. On trips afield with entomological friends, he has collected cicadas high on mountainsides and, at the opposite extreme, more than 200 feet below sea level near the Salton Sea in California. Here, he found a new species. He has made several trips through Southern states.

It was on one of these Southern trips that he had his celebrated encounter with the rattlesnake. As he was turning over some rocks, a small ground rattler struck him on the hand. Capturing the venomous serpent, he stored it away in a cyanide killing jar. Then he began setting down detailed notes which recorded all his sensations before and after his visit to the doctor. These elaborate notes, which he continued making until he was entirely recovered from the effects of the venom, later appeared in the form of a scientific paper.

During his years of careful observing, many scientific papers, monographs and notes have come from his pen. His book, *Days Afield on Staten Island,* was first published for private circulation in 1892 when he was thirty years old. It has been reissued under the imprint of the Staten Island Historical Society and still is attracting purchasers half a century after its original publication. It carries to the written page, to a remarkable degree, the quiet, kindly charm of the writer. The book reflects the deep and sincere joy he found in days afield.

It is this sincerity, together with his wide background of knowledge and his considerate and conciliatory nature, which have made him invaluable to the scientific societies to which he belongs. Once, on a trip to the South, he encountered two entomologists who argued interminably over hypothetical questions. Mr. Davis suggested:

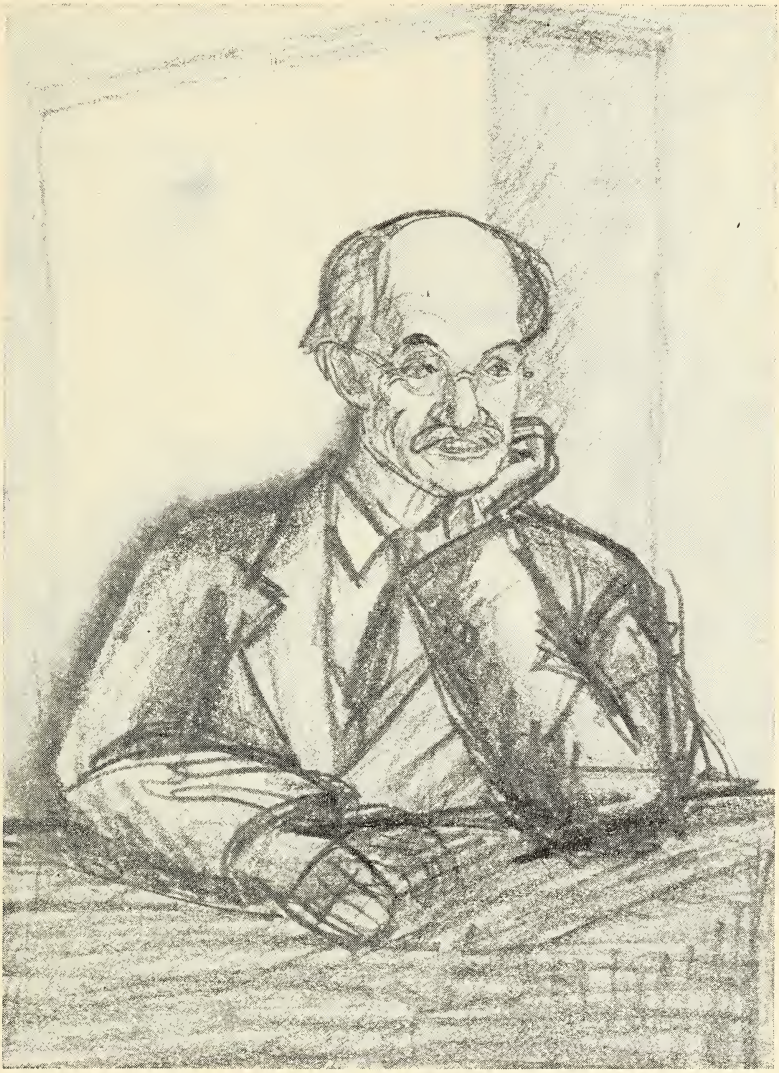
"Why don't you say 'maybe so' when you are defending ideas that you can't absolutely prove?"

As a result, the "Maybe So Society" was formed. Other scientists joined it and the group developed into an organization of considerable influence. Each year, the society held an annual and amicable outing at which all scientific arguments were prefaced by: "Maybe So."

Similar examples of Mr. Davis' tact, common sense and kindly good will are legion. Oftentimes, his quiet suggestions have smoothed over rough places in the paths of the societies to which he belongs. An outstanding tribute and a reflection of the esteem in which he is held is the fact that after holding the presidency of the Brooklyn Entomological Society for four consecutive years—from 1912 to 1916—he was reelected in 1920 and has presided over the meetings continuously for twenty-two years since that date. For a quarter of a century, from 1904 onward, he acted as treasurer of the New York Entomological Society, of which organization he also became president. During eleven successive years, he was president of the Staten Island Bird Club.

The New York Academy of Sciences and the American Association for the Advancement of Science made Mr. Davis a Fellow in 1910. Since 1917, he has been a Fellow of the Entomological Society of America. In 1941, the Park Association of New York City awarded him a citation for his interest in and assistance to the development of parks and nature recreation centers on Staten Island. The official citation refers to him as: "A founder of the Staten Island Institute of Arts and Sciences; a renowned authority on plant and animal life; the author of many books on Staten Island, the beauties of its parks, wild life and natural landscape; a member of the Park Association since its incorporation; one who as author and teacher during most of the 78 years of his life has done much to bring to old and young, especially to those of his native Staten Island, an appreciation of the needs and meaning of parks and their extension and improvement."

Such honors have left Mr. Davis unchanged—as sincere and steadfast, as devoted as ever to the simple things of the natural world. At this time, when his years have passed the Biblical three



William T. Davis presiding over a meeting of the Brooklyn Entomological Society. (Pencil sketch *in situ* by Theodore de la Torre-Bueno.)

score and ten and "by reason of strength they be four-score years," the freshness of his outlook and his perennial joy in the green world and the creatures that live under the open sky have been emphasized by a poem by Willard M. Grimes entitled:

To William T. Davis on His Birthday.

These years are just a bird-walk round the sun,
  Another Day Afield in which to stroll
  And look for locusts on some grassy knoll.
Nature's Scheherazade is never done—
One story ends but others are begun;
  Before us beckons an elusive goal
  With ever-fresh allurement for the soul,
New streams to cross and hilltops to be won.

There are so many things to see and know:
  A new cicada may be found this year,
  Or jelly-fish in Brady's pond appear.
So friend, let's take our walking sticks and go,
  Seeking fresh treasure in some well-loved haunt.
  The day is bright—we'll start another jaunt!

Note on Stictopelta nova Goding.—*Stictopelta nova* Goding (Homoptera; Membracidae) was described from California in 1892 but has never been mentioned in the literature of the family, except in catalogue references, since the original description. It is apparently a rare species but we have a few specimens in our collection from California, Arizona and New Mexico. Nothing has ever been known of its life history or host plants. On August 1, 1942, Mr. J. R. de la Torre-Bueno took four specimens on cat's claw (*Acacia gregii* Gray) in Lower Sabino Canyon, about fifteen miles west of Tucson, Arizona, and reports that this shrub is a definite food plant. This is the first record of a host plant for this species.—W. D. FUNKHOUSER, Univ. of Kentucky, Lexington, Ky.

THREE NEW CORIXIDAE FROM THE SOUTHERN STATES.

By H. B. Hungerford, Lawrence, Kans.*

These three little species have been in the Snow Collection as manuscript species for some years, and it now seems advisable to describe them.

Sigara paludata n. sp.

Size: Length 3.38 mm. to 3.69 mm.; width across the eyes 1.13 mm. to 1.35 mm.

Color: Signata type of pattern, about seven pale bands on pronotum as wide as dark bands. Basal claval pale bands broken and more or less furcated, oblique; those on distal end of clavus and on corium, undulate and longitudinal, more or less fused into longitudinal series. Membrane brown, translucent with indefinite pattern, not definitely set off from corium. Head, legs and venter pale. The male abdominal venter darker.

Structural characteristics: Facial fovea of male shallow and indistinct. Vertex slightly produced in the male, rounded in the female; inner margins of the eyes but slightly divergent; interocular space narrow. The synthlipsis: hind margin of an eye : : 2.6 : 3. The rear margin of the head conspiciously produced medianally. Pronotum and hemelytra shining, the former faintly rugulose. The ostiole just laterad of the tip of the mesoepimeron. The metaxyphus broader than long, the tip bluntly rounded. Pala of male as shown in figure 1 with 12 to 15 pegs. The femur with a faint stridular area. The strigil longer than broad with four striae. The genital capsule as shown in figure 1a; the curiously formed right clasper is characteristic. This suggested the name "paludata", wearing a cloak.

Location of types: Described from holotype, allotype, and four paratypes in the Francis Huntington Snow Collections taken at Nealy, Miss., Sept. 2, 1930, by H. Dietrich; and 1 male paratype from Wrens, Ga., Aug. 22, 1930, Paul W. Oman.

Comparative notes: This species has the color pattern of *S. signata* (Fieb.), and the shape of the male pala is much the same. It is, however, a much smaller species and has a relatively narrower mesoepimeron with the ostiole near the tip instead of remote from the tip as in *S. signata* Fieb. In size it is but slightly larger than *S. bradleyi* (Abbott). The pronotum has more pale bands, but the pattern of hemelytra is about the same.

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* Contribution of the Department of Entomology, University of Kansas.

Sigara macrocepsoidea n. sp.

Size: Length 2.48 mm. to 3.06 mm.; width across head .99 mm. to 1.08 mm.

Color: Signata type of pattern. The very short pronotum crossed by three or four pale bands, slender pale oblique, somewhat furcate lines on basal half of clavus. Those on corium slender undulate, more or less longitudinal, broken. The pattern continued onto membrane without demarcation becomes transverse. Head, legs and venter light.

Structural characteristics: Facial fovea of male marked, broad, surpassing the inner angle of the eyes. Vertex of male a little produced, inner margin of the eyes slightly divergent. Interocular space of moderate width. The synthlipsis: hind margin of an eye : : 0.9 : 1. The rear margin of the head produced medianally. Pronotum and hemelytra shining, the pronotum faintly pebbled; pronotum short and flight wings aborted. The ostiole just laterad of the tip of the mesoepimeron. The metaxyphus as long or a little longer than broad; tip bluntly rounded. Pala of male as shown in figure 2 with seven to nine normal pegs and three large ones. The strigil longer than broad with 3 striae. The genital capsule as shown in figure 2a.

Location of types: Described from the holotype, allotype, and paratypes in the Francis Huntington Snow Collections. The type series are as follows: "Okefenokee Swamp, Georgia, July 30, 1934, R. H. Beamer." 13 specimens. Same place, Aug. 3, 1934, by Beamer and McKinstry, 13 specimens; Folkston, Georgia, Aug. 2, 1934, R. H. Beamer, 3 specimens. In addition I have three specimens from Wood Co., Texas, taken Feb. 26, 1939 by D. Millspaugh.

Comparative notes: This species reminds one of *Trichocorixa macroceps* Kirkaldy, hence the name. No doubt the reduced pronotum is associated with the aborted flight wings. The size is the same, but besides various generic character differences, the male pala and the claspers are decidedly different.

Sigara mississippiensis n. sp.

Size: Length 4.5 mm. to 4.95 mm.; width across the eyes 1.45 mm. to 1.53 mm.

Color: Seven pale bands on pronotum a little narrower than the dark bands, the third and fourth joined at their ends; a medium longitudinal pale stripe on the pronotum. Basal claval pale bands uneven and obliquely transverse; the others on clavus and corium slender, undulate and longitudinal, more or less joined end to end, forming two longitudinal crooked lines on corium, a row of pale blotches along inner margin of corium. Membrane dark with transverse pale figures, not definitely separated from corium. Head, limbs, and venter pale. Ventral basal abdominal segments may be dark in male.

Structural characteristics: Facial fovea of male shallow, oval, ill defined. Vertex moderately produced as seen from above in both sexes, a very faint low median longitudinal elevation on caudal half. Rear margin of the head caudally produced on median line. Pronotum lightly rastrate, hemelytra shining, only basal half of clavus pebbled. Metaxyphus broader than long. Male pala with 15–16 pegs arranged as shown in figure 3. Femur with stridular area. Strigil .18 mm. long and two-thirds as wide, of 6 striae. Genital capsule of male as shown in figure 3a.

Location of types: Holotype, allotype, and paratypes in the Francis Huntington Snow Entomological Collections, University of Kansas. Described from the following series: 18 specimens from Lauderdale, Miss., July 17, 1930, taken by R. H. Beamer, Paul W. Oman, and L. D. Tuthill. I have also 33 specimens taken from Beaumont, Miss., April 19, 1932 by H. Dietrich; 2 from Grand Bay, Ala., July 11, 1934, R. H. Beamer; 1 from Macon, Ga., July 17, 1930, R. H. Beamer; 1 from Emanuel Co., Ga., Sept. 6, 1929, Creaser and Becker; 1 from Prattsburg, Ga., July 25, 1930, R. H. Beamer; 1 from Newberry, S. C., Mathew's Lake, Oct. 23, 1930, D. Dunovan.

Comparative notes: This species is very near *S. machinacensis* (Hungerford) described from northern Michigan. In color pattern it is almost identical. However, it is distinctly a smaller species. The vertex in both sexes is more produced and the male pala, the strigil, and the right clasper are uniformly different.

EXPLANATION OF PLATE III.

Figure 1. *Sigara paludata* Hungerford—Front leg of male.

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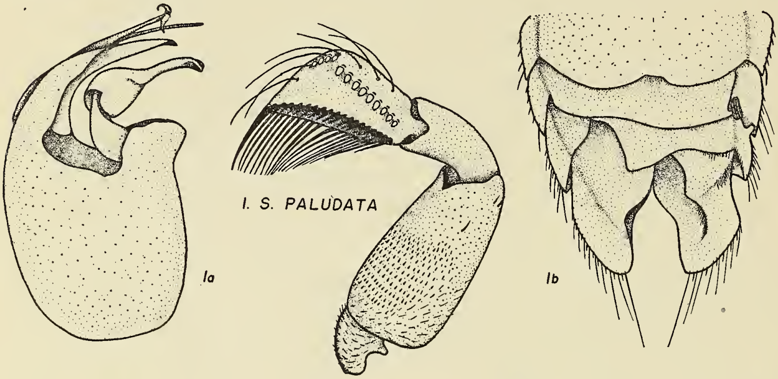
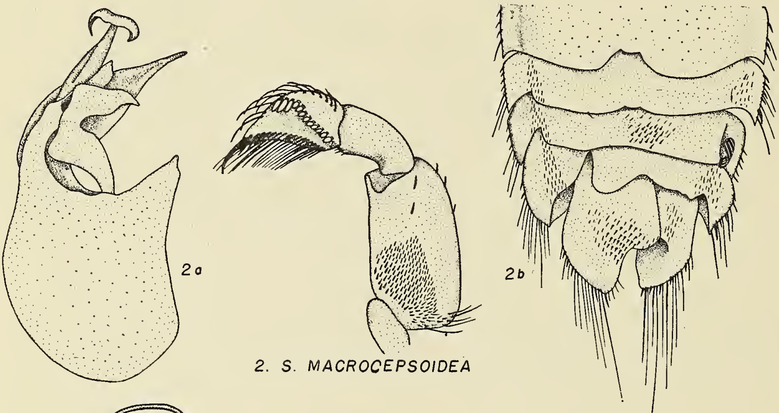
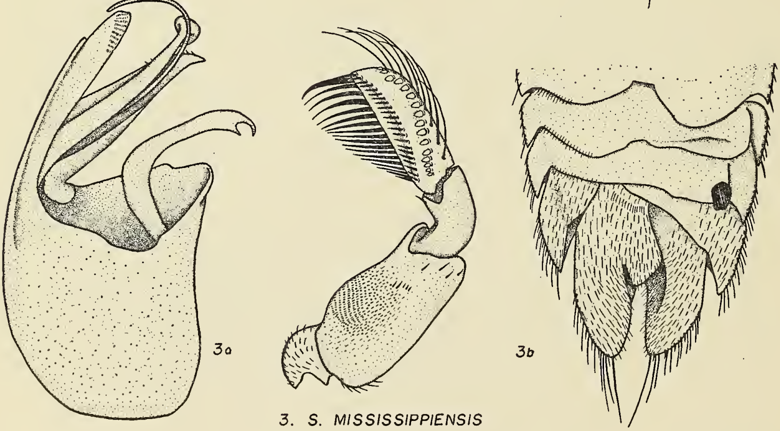
PLATE III



1. S. PALUDATA



2. S. MACROCEPSOIDEA



3. S. MISSISSIPPIENSIS

Figure 1a. *Sigara paludata* Hungerford—Male genital capsule.
Figure 1b. " " " —Male abdominal dorsum.
Figure 2. *Sigara macrocepsoidea* Hungerford—Front leg of male.
Figure 2a. *Sigara macrocepsoidea* Hungerford—Male genital capsule.
Figure 2b. " " " —Male abdominal dorsum.
Figure 3. *Sigara mississippiensis* Hungerford—Front leg of male.
Figure 3a. *Sigara mississippiensis* Hungerford—Male genital capsule.
Figure 3b. " " " —Male abdominal dorsum.

Maternal Solicitude in Gargaphia iridescens Champion.—Observers of the Heteroptera have noted that certain species appear to care for their young in some way. In our northeastern States adults of the tingid *Gargaphia tiliae*, have frequently been observed apparently watching over groups of young nymphs. Possibly this is a not uncommon habit within the genus, as the following from my field notes might seem to indicate. In Tucson, Ariz., on June 23, 1935, numerous *Gargaphia iridescens* Champion, were found running about on the *upper* surface of the leaves of a yellow hollyhock, an importation from Russia, in a garden. This species was watched from then on, for nearly three weeks. On the 30th, one individual was noted apparently *brooding* over a group of eggs, probably its own, on the under side of a leaf. On July 6th this adult came off the eggs, but stayed by the emerging nymphs. On the 7th, the very young nymphs were grouped a short distance from the place where the eggs had been, the adult remaining close at hand, but not brooding the nymphs. A second bleached spot on another leaf had eggs on it, with another adult in attendance, but not on them. These bleached spots were irregularly square and about 6 mm. × 6 mm. In the first group of nymphs there were 13 individuals just hatched; the female mentioned above which had actually been covering the eggs with her body stood close by, but not touching the nymphs. On the 8th, the nymph and the adults had moved away. The other adult also had left the second lot of eggs. On the 10th, on another leaf, two lots of eggs and a group of nymphs were noted with another adult close by.—J. R. de la Torre-Bueno, Tucson, Ariz.

W. T. D.

By Howard Cleaves, Staten Island, N. Y.

Excepting only my own father no man has exerted greater influence for good in my life than William Thompson Davis. The association goes back nearly forty years to a time when W. T. D. was younger by several years than the writer is at the moment: back to the beginnings of the present century when our family reached Staten Island from Illinois via Philadelphia and Brooklyn. I had met two kindred souls, James P. ("Chippy") Chapin and Alanson B. ("Allah" or "Buck") Skinner, at Curtis High School and both had told me, "You must meet Mr. Davis." So, by prearrangement on a non-school day in about the year 1903 or 1904, I walked from our home near The Beach at Prince Bay to the railroad station in Huguenot Park where Chapin, Skinner and Mr. Davis got off a Staten Island Rapid Transit train and walked toward me, Mr. Davis in the middle. Together the four of us walked the two miles to the Wort farm in Rossville, a favorite rendezvous then and for many years afterward for all of us "queer" naturalist people and our friends from afar. Who can forget the Wort dining table, so enlarged by added leaves that it took three table cloths to cover it; and the steaming mountains of boiled potatoes, corn and chicken—a feast to satisfy Paul Bunyan?

A matter of perennial surprise to Mr. Davis is his own longevity. That he is approaching his eightieth birthday evokes in him a feeling of genuine wonder. "I ought to have died long ago" he will say, "I was so poorly put together." Recently he remarked, "These birthday celebrations will kill me." True, he is a small man except when seated, the shortness being in his legs. Yet those short legs have carried him far in the field and continue to do so and no doubt their regular use through the years accounts in a measure for that bewildering longevity. Mrs. Cleaves, our son Henderson, eleven, and I have walked many miles in a day along the charming sand roads of the New Jersey pine barrens with Mr. Davis, yet on our return to camp base in the vicinity of the old Lahaway Plantation near Prospertown we have owned up to being fatigued while he has appeared ready for additional miles. His easy, plodding gait is deceiving. It was many, many years ago that I visited Mr. Davis while he was propped up in bed at the Staten Island Hospital. He was recovering from a serious operation in which it was necessary for the surgeon to open up his abdominal cavity through the back and "hitch up" his kidneys which had sagged. The surgeon long since died. The patient, to the relief of his host of friends, lives on, repairs and all.

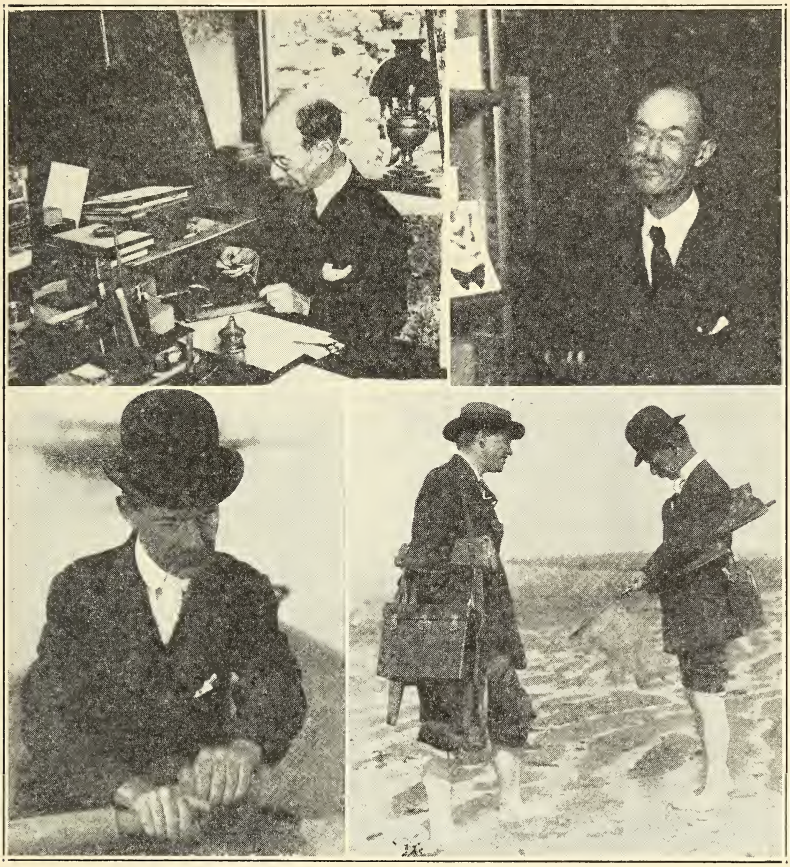
In personal living Mr. Davis follows a pattern of frugality which might conceivably be mistaken for something else by the uninitiated. Surrounded by a "streamlined" world, the Davis house at 146 Stuyvesant Place has never been wired for electricity; the telephone is on a multi-party line; his meals, especially the lunches carried afield, are often just about right for Gandhi; and where another would take a bus for Stapleton, Mr. Davis elects to walk. Yet you may read in the morning paper that this modest man has bought the old court house in Richmond to preserve it for posterity; or learn that he has spent a thousand dollars to fence a bird sanctuary; or that he has bestowed still another life membership in the Staten Island Institute of Arts and Sciences upon some individual regarded by him to be worthy. Nobody can say how many times he has sent five, ten or fifteen dollars to some hillbilly correspondent in Mexico, Texas or California for collecting a few specimens of cicadas, not that the insects are worth that, but because "The poor devil probably needs the money." Spending by W. T. D. is where values are enduring and is usually related to the natural sciences or to Staten Island or both.

One cannot associate with Mr. Davis for long without being impressed by his versatility. Our early acquaintance began prior to his retirement from formal business about 1910. That business had been the tedious and exacting job of keeping straight the more than three thousand individual accounts of the members of the New York Produce Exchange in lower Manhattan. The meticulousness exacted during those years has ever since been applied by Mr. Davis in the keeping of notes, labeling of specimens, dating and mounting of photographs, and in the conduct of his not inconsiderable affairs involving finance, real estate, investments and the like. This capacity for close application, plus self-drive, stood him in good stead when, in collaboration with his dearest friend and life-long companion, the late Charles W. Leng, he undertook the truly staggering task of writing the fat volumes, *A History of Staten Island and Its People.* At the time the co-authors were both not far from seventy years of age. Quite an achievement.

W. T. D. admires a well turned phrase and has done a deal of turning himself. Portions of his *Days Afield on Staten Island,* recently brought out in second edition, are considered by many to be on a par with Thoreau and Burroughs. This appreciation of good writing accounts for his long and active affiliation with the local belle-lettres society whose members, happily, are fully alive to his talents.

So elastic is the Davis mind that there is room in it for everything from superficial nonsense to the most profound scientific matter. While Mr. Davis sits at the big table in the Attic Room of the museum at St. George, two blocks north of his home on Stuyvesant Place, examining under a hand lens the uncus and operculum of a new species of cicada, the visitor has only to glance upward a few feet to perceive the rather startling hairless, desiccated carcass of a house cat, mounted in a shallow cardboard tray and resting atop a bookcase. The unfortunate creature perished long years ago in a wall space near a furnace and because of the peculiarities of moisture and temperature pussy did not disintegrate but became gradually like a mummy. There was something about this cat that appealed to Mr. Davis, so he saved it. At the end of the bookcase which supports the dried cat is a small bulletin board where one may see among other curios an amusing picture representing an absent-minded entomologist in church. While taking up the collection with a long-poled gadget resembling a collector's net he sees a butterfly, pursues it among the congregation. Overhead and all around are countless more trinkets and oddities, each with a history and each having stimulated its due quota of chuckles. Against this background has gone forward the steady, solid, valuable and very pleasant task of naming and describing between seventy-five and one hundred species of cicadas new to science, including one graciously named for the present writer.

If you would know a person for what he really is, go afield with him. A camping trip is the supreme test. I have camped and tripped with W. T. D. in Cape May County, the Pine Barrens and elsewhere in New Jersey, on Gardiner's Island and on Long Island and up the Hudson River in New York, and to many a nearer locality. Such experiences are gold mines of information and kindly instruction, of pleasing homespun philosophy. It is during these intimate outdoor associations that Mr. Davis' companions become aware of the extent of his knowledge in practically every branch of natural history. He is that almost extinct rarity, the competent, all-'round naturalist of the old school. To all of us on Staten Island he is a veritable living encyclopedia naturae. On our monthly Bird and Nature Club field walks it is so much easier for all hands to call out, "What's this, Mr. Davis?" or for one member to say to another, "Show it to Mr. Davis, he will know what it is"—so much easier than to lug home specimens and work them out for one's self.



Reading from left to right—William T. Davis in his famous attic room at 146 Stuyvesant Place, Staten Island, in July 1928. Soon after this his collections were moved to the fire-proof Museum Building. The W. T. D. smile, on the same occasion. William T. Davis at the oars, Great Kills, Staten Island. William T. Davis with Alanson Skinner, Great Kills; on his forty-seventh birthday, October 12, 1909.

Selected from my own random recollections, here are a few items that have received the lively attention of W. T. D. in the recent past:

Hybrid oaks at Tottenville
Varied thrush near Richmond
Small crustacean found in our cellar drain
Fresh water jellyfish from Brady's Pond, Grasmere
Cicada killers at Oakwood Heights
Salamander (extra large) found on Stuyvesant Place
Painting of old mill (now gone), Oakwood meadows
Cicadas from everywhere, every year

As Mr. Davis remarked to me not long ago, "I need no movies or radio to entertain me."

Through the many years of our association I have marveled at his placidity, often under circumstances which would prove irritating to others. One of our earliest trips together was to Tuckerton, New Jersey, where Mr. Davis sought tree crickets particularly. He engaged a room in a private residence where both of us bunked in the same double bed. Our combined weight proved too much for the bed slats which came loose from their moorings in the dead of night, dropping us both to the floor with a jolting crash. This would have been reason enough for complaint to the landlady by any less mild individual. Mr. Davis dismissed the incident with reserved amusement. Mosquitoes, ticks and other pests he may ignore while they are feeding on him, brush them off uninjured, or even deliver himself of a little discourse of a philosophical character for their benefit. I have wondered at times how he can bring himself to the point of killing any insect even for his collections. Once when on a collecting trip in the south with a friend he was bitten by a small rattle snake. He did not blame the snake because it had striven only to escape into a heap of rubbish. An injudicious hand had been inserted after the reptile, hence the bite. Far from having the injury treated, Mr. Davis continued calmly afield through the heat of the southern day, even though his bitten finger, then his arm, began to pain, then to swell and discolor. That evening the landlady insisted that he see the local doctor. Arrived reluctantly at the doctor's, the patient waited his turn in the outer room. Finally, almost by accident, the doctor discovered the quiet little man and inquired casually, "What can I do for you, Sir?" It would have been worth a good price to see that small town doctor's face when he heard the reply, "Why, I was bitten by a rattle snake." Then the doctor asked "When?" and Mr. Davis said "This morning."

That rattler, "pickled" and safely reposing in a glass jar among the Davis collections, is brought out occasionally and exhibited by request and if we are in top luck we can induce Mr. Davis to relate the whole experience over again. The account has long been in print but a first-hand telling possesses much the richer flavor.

Of his comparatively few journeys to distant parts of our country W. T. D. retains vivid, detailed recollections. He has been to California, Arizona, Texas, Florida, Georgia, the Carolinas and several times to Virginia where he spent happy days on and along the James River at the invitation of his gifted and much admired friend, the late Col. Wirt Robinson.

It was during one of these trips to distant parts that the train came to a halt which promised to be of considerable duration. The surrounding country held promise, so Mr. Davis left the train to do a bit of collecting. He had just caught a desirable looking and lively beetle when the locomotive whistle gave several toots. There was no time to kill or bottle the insect so Mr. Davis popped it into his mouth and sprinted for the train.

Other people may forget to provide themselves with the little accessories without which it is impossible to collect or carry home the unpredictable and often inviting objects one discovers afield, but never Mr. Davis. Let some lady exclaim, "Oh, what gorgeous looking blackberries! If only I had something to put them in I could pick enough for a pie" and you will see Mr. Davis reach deep into the bag department of his amazing wardrobe and produce just the bag for the purpose. From other pockets and from his hat, like a magician, he is able endlessly to produce little vials, tin and cardboard boxes, string—white, brown, red, blue and even yellow string—rubber bands, safety pins, stubby pencils and an all-purpose jackknife any Boy Scout would be proud to possess. During periods of low demand the many coils of string become compressed as figs in a package and require a degree of separating when the pellet-like wad is drawn forth. But muster a little patience and your needs will soon be satisfied.

Like the cicadas to which he has devoted his best entomological talents, Mr. Davis likes hot weather. Seen at his outdoor best he should be encountered afield on one of those steaming days in July or August when heat waves dance above the salt meadows, the white herons are up from the south and the reedy pulsations of cicada "song" beat against the human ear drum from every side. If fully caparisoned he will be wearing the time-honored straw hat, a thin black alpaca coat, substantial trousers of ample dimensions, black high-top shoes on the best of terms with the Davis feet through long acquaintance, a three-foot straight stick cut in the woods and polished from much carrying, an obsolete U. S. canvas haversack, initials painted out, and the kindliest smile you ever saw. The uninitiated, walking just behind W. T. D. and noticing his back, may be forgiven for being at first a trifle startled at what appears like some sort of deformity. This, however, is no physical defect but a collecting net carried tucked up under the alpaca coat, ready for almost instant action. Should a wanted tiger beetle appear just ahead in the path the onlooker is treated to a superb example of an entomologist on point. The trained eye of the veteran stays fixed on the beetle, his body remains motionless as a stealthy hand reaches toward his back for the net and the other hand, with equal stealth, attaches that three-foot stick as a handle. Next, with the concentration of a green heron stalking a minnow, the distance between hunter and quarry is reduced inch by inch until the watcher can scarcely stand the tension longer. Then, *wham,* and another Cicindelid is on its way into the Davis collection.

When a man is as widely known as William T. Davis, and is universally beloved by all who know him, he ceases to be just a man. In spite of himself he evolves into something in the nature of a public institution. His countless friends feel almost as if they had proprietary rights in him!

So, good and very dear W. T. D., endure the celebration with fortitude and reflect that few, perhaps, are remembered by so many at eighty.

William T. Davis, Howard Cleaves, Charles W. Leng; on a field trip of the S. I. Bird Club; about 1926.

WILLIAM T. DAVIS, THE NATURALIST.

By J. Bequaert, Boston, Mass.

Almost the very day the hazards of life brought me to the shores of the New World, it was my good fortune to become acquainted with William T. Davis. He has honored me with his friendship ever since. As years went by he rose steadily in my admiration and affection, for I discovered in him the living prototype of my own boyhood's dream, the Complete Naturalist.

Your true Naturalist is not merely the friend of Nature; he is also, as it were, its father confessor. Of course, he is on affectionate terms with the world he lives in. Not content with this, however, he aims at prying out all its secrets. To this he is driven by an unquenchable curiosity, each discovery—big or little—only spurring him on to further detective work. His glory and joy are not in knowing things, but in finding them out. Of this type of true Naturalist, so radically different from the stodgy professor or the hidebound laboratory biologist, William T. Davis is an outstanding example, proving that even in our over-specialized twentieth century it is possible to learn a great deal about many things.

Like a "species," a Naturalist is hard to define, yet easily recognized when you meet him. Many a happy hour I spent with friend Davis among the treasures of his attic or of the annex close-by. Our discussions would occasionally be interrupted by a visit to the nearest coffee emporium. But it is our walks together which I remember with the keenest pleasure. Sometimes they were on his native Staten Island, which he knows and loves so well—forward and backward, so to speak. Indeed, its history, whether told by human records or by the pebbles of the hills, is as dear to him as its animals and plants. Not infrequently we would wander farther afield;—to the plains and woods of Long Island, inaccessible Gardiner's Island, the Pine Barrens of New Jersey, the remote Catskills, the summit of Mt. Washington, and many another locus now duly recorded in our collections by properly labelled specimens. Often other entomological or botanical friends would join us; but by tacit and unanimous consent Davis remained the Leader. To him we would turn for satisfactory answers and interesting comments. Moreover, he could guide us unerringly to the hide-outs of unusual plants and animals, as well as to the lonely dwelling most likely to provide us with refreshment or shelter for the night.

At the close of one of these happy days, how often did we sit together far from the City's turmoil, going over the day's findings.

These friend Davis would review with many an illuminating sidelight, revealing the life-long keen observer. His remarks never showed a trace of pedantry; but they might be relieved with humorous anecdote or seasoned with flashes of a kindly yet realistic philosophy, such as can come only from a man who spends his life asking Nature for the truth.

It is the peculiar boon of the Naturalist that he can look back upon his life with undiluted satisfaction. Was there a day that friend Davis did not add to his store of Nature wisdom? And, more than all this, was he not always ready and eager to share his knowledge and love of Nature with others? As a spokesman for the many he helped and inspired, I beg him to accept this modest tribute as a token of gratitude and esteem.

CARNUS HEMAPTERUS NITZSCH, AN ECTOPARASITIC FLY OF BIRDS, NEW TO AMERICA (DIPTERA).

By J. Bequaert, Boston, Mass.

A small collection of bird parasites recently received from Mr. Malcolm J. Lerch, of Penn Yan, New York, contained several minute deälated flies, taken from a nestling flicker. They proved to belong to the genus *Carnus,* the single known species of which is fairly common on birds or in their nests, in parts of Europe. I have found, among the unnamed Diptera at the Museum of Comparative Zoölogy, additional specimens of the same parasite, taken many years ago in Florida from a screech owl.

As these appear to be the first American records of *Carnus,* I am reviewing what is known of these parasites and append a reference list of the European literature. A similar list was compiled by Bezzi in 1922, to which Eichler (1936 and 1937) added later references.

Taxonomy.—European authorities accept only one species in the genus, *Carnus hemapterus* Nitzsch (1818, p. 305; figured by Germar, 1822, Pls. 24 and 25), with *Cenchridobia eggeri* Schiner (1862, p. 436) and *Carnus setosus* Stobbe (1913, p. 193) as synonyms. The main character on which Stobbe based his *setosus* was the denser and longer vestiture of setae. No doubt this was a deceptive appearance, caused by the more shrivelled or less physogastric condition of his specimens. Similar apparent differences are noted between newly hatched and fully engorged ked-flies (*Melophagus* and *Lipoptena*). Moreover, the male of *Carnus* seems to be more hirsute than the female, as its abdomen swells much less.

The taxonomic relationships of *Carnus* are as yet somewhat in dispute. While most recent students agree that the genus is closely related to *Meoneura,* some are content to leave these two genera in the Milichiidae, while others place them in a separate family, the Carnidae, first erected by Hendel (1928). In Curran's key to the North American genera of Milichiidae, which family he calls Phyllomyzidae (1934, Fam. Gen. N. Amer. Dipt., p. 334), *Carnus* runs out to *Paramyia,* both genera lacking the posterior cross-vein (*m*); but it is readily separated by the obsolescence of all cross-veins except the anterior (*r-m*) and the simple, short, swollen proboscis. It differs from its closest relative, *Meoneura,* in having only one cross-vein, in the fourth and fifth longitudinal veins much shortened and ending far from the hind margin, and in the short and swollen proboscis. Melander includes *Carnus* in his table of the genera of Milichiinae (1913, Jl. New York Ent. Soc., XXI, p. 237); but it should be noted that the wings cannot properly be called rudi-

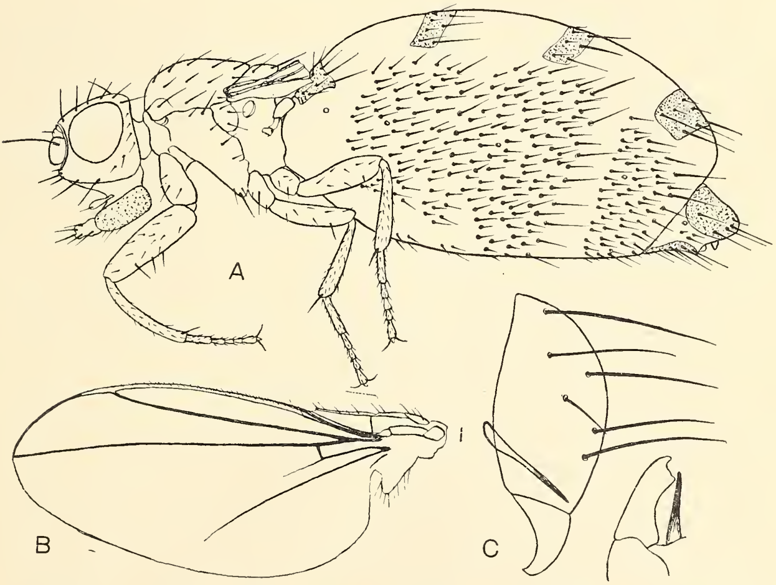


Figure 1. *Carnus hemapterus* Nitzsch. A, female, with retracted ovipositor, off *Colaptes auratus luteus;* Penn Yan, New York. B, wing of newly-hatched fly of Germany (after de Meijere). C, male external terminalia of Florida specimen, off *Otus asio* (from the side and below).

mentary. As all my American specimens are deälated, I have copied de Meijere's figure of the wing of the European form (Fig. 1B), for comparison with *Meoneura.* The latter occurs in North America also, and some species have been bred in Europe from birds' nests, where they live as scavengers only, the adult flies never being found on the birds themselves.

I was unable to compare my American *Carnus* with European specimens, none of which appear to exist in any American collection. I have, however, carefully studied all published descriptions and figures, particularly those of Collin (1911), de Meijere (1913), Séguy (1930 and 1934), and Hennig (1937). I have been unable to discover reliable differences and I am forced to the conclusion that the North American flies are identical with *Carnus hemapterus.* The chaetotaxy of head, thorax and tergal and sternal plates of the abdomen is the same. The abdominal sclerotized plates of both sexes also agree. There is a slight difference in the distribution of the setae over the soft areas of the abdomen, if my drawing is compared with de Meijere's figure of the female (1913, fig. 2), but this is scarcely of importance. The male terminalia are practically identical. It may be noted that in my drawing the eye is relatively larger and the jowls or cheeks shorter than figured by de Meijere. I was at first inclined to regard this as a reliable difference, at least of subspecific value. Hennig's figure of the head (1937, p. 74, fig. 73) is, however, practically like my own, while Séguy's (1934, p. 632, fig. 816) shows even larger eyes. I may add that in my American specimens the eyes are of about the same relative size in both sexes.

Distribution.—In Europe, *C. hemapterus* seems to be fairly generally distributed and no doubt it will be found eventually in northern Asia also. At present there are definite records from the Netherlands (de Meijere, 1928), Germany (Nitzsch, 1818; de Meijere, 1913; Nöller, 1920; Engel, 1920; Wülker, 1925; Eichler, 1936; etc.), Switzerland (Wegelin, 1933), Austria (Egger, 1854; Stobbe, 1913), Jugoslavia (Stobbe, 1913), Italy (Bezzi, 1922; Séguy, 1930), Roumania (Collin, 1911), Lithuania (de Meijere, 1928) and Finland (Frey, 1921; Nordberg, 1936).[1] In America, *Carnus* is probably also widespread, as shown by its being known from New York (Penn Yan) and Florida (without more precise locality). Its distribution will become known only through an extensive and systematic study of the arthropod fauna of birds' nests, a field which is almost virgin.[2]

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[1] Bezzi (1922) includes Hungary in the range, but I have failed to trace a published record from that country. The occurrence in France is open to question, as Mercier (1928) does not state where he obtained his specimens and Séguy does not list a French locality.

Host Relations.—The following is a list of all known European hosts, arranged as to families, with the countries where they were observed in nature, either by breeding them from the nests (N) or on the birds (B). An asterisk marks hosts known to nest normally in cavities or sheltered places.

Fam. ACCIPITRIIDAE: *Haliaeetus albicilla* (L.). Finland. N.
Aquila heliaca Sav. (= *imperialis* Bech.). Jugoslavia. B.
Fam. FALCONIDAE: *Falco peregrinus* Tunst. Finland. N.
* " *tinnunculus* L. Austria, Germany. N, B.
" *cherrug* D. E. Gr. (= *sacer* Gmel.). Roumania. B.
" sp. Italy. B.
Fam. COLUMBIDAE: **Columba livia* Gm. (= *domestica*). Finland. N.
* " *oenas* L. Finland. N.
Fam. TYTONIDAE: **Tyto alba* (Scop.). Germany. N, B.
**Aegolius funereus* L. [*Cryptoglaux*]. Finland. N.
Fam. PICIDAE: **Dryobates major* L. Austria, Finland. N, B.
**Picus viridis* L. Germany. B.
**Dryocopus martius* L. Finland. N.
Fam. JYNGIDAE: **Jynx torquilla* L. Germany, Switzerland. B.
Fam. HIRUNDINIDAE: **Delichon urbica* L. Finland. N.
Fam. CORVIDAE: *Pica pica* (L.). Finland. N.
Corvus cornix L. Finland. N.
" *corone* L. Lithuania, Germany. B.
**Colaeus monedula* (L.). Netherlands, Finland, Germany. N, B.
Fam. PARIDAE: **Penthestes atricapillus* (L.). Finland. N.
**Parus ater* L. Finland. N.
Fam. CERTHIIDAE: **Certhia familiaris* L. Finland. N.
Fam. TURDIDAE: *Turdus philomelus* Brehm. Finland. N.
Arceuthornis musicus (L.). Finland. N.
**Phoenicurus phoenicurus* L. Finland. N.
Fam. SYLVIIDAE: *Regulus regulus* (L.). Finland. N.
Sylvia atricapilla L. Germany. N.

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[2] Most American papers dealing with this topic are confined to the blood-sucking maggots of *Protocalliphora* or (more rarely) to fleas or ticks. McAtee (1927 and 1929), Jellison and Philip (1933), and Dobroscky (1925) are the only investigators who paid attention to all arthropods found in nests.

Fam. Sturnidae: **Sturnus vulgaris* L. Germany, Switzerland, Italy, Finland. N, B.
Fam. Ploceidae: **Passer domesticus* L. Switzerland. N.
Fam. Fringillidae: *Fringilla coelebs* L. Finland. N.

This list brings out some interesting points. In the first place, host specificity of *Carnus* is very slight and similar to that of many common Hippoboscidae of birds. It seems to be governed chiefly by certain features of nesting ecology and not at all by the taxonomic affinities of the hosts. Flies were bred from the nests of 24 species (of 14 families) and were taken from birds of 9 species (of 7 families). Out of a total of 29 bird hosts, 5 only have yielded them thus far from the birds as well as from the nests; but this is merely due to the method of obtaining the host records. Those known from Finland only (17 out of 29) were based entirely on a study of the contents of abandoned nests, no attempt being made at finding flies on the nestlings. For some birds the larvae of *Carnus* are the dominant or constant arthropods of the nests. Nordberg found them in 55 per cent of 11 nests of *Turdus philomelus,* 86 per cent of 7 nests of *Parus ater,* 67 per cent of 12 nests of *Phoenicurus phoenicurus,* 100 per cent of 57 nests of *Colaeus monedula,* 91 per cent of 22 nests of *Sturnus vulgaris,* and 62 per cent of 13 nests of *Columba oenas.* A slight preference is shown for birds nesting in sheltered places, 17 (or 58 per cent) out of a total of 29 being of this type. Moreover, this group contains most of the birds in whose nests *Carnus* is often the dominant nidicole. The remaining 12 birds (42 per cent) all build nests in the open, but some distance above the ground, either in trees or on ledges. True ground and swamp nesting birds are completely avoided.

The only hosts known thus far in America, *Colaptes auratus* (L.) and *Otus asio* (L.), both nest in cavities or well sheltered places. Nine flies (2 ♀, 7 ♂) were taken many years ago in Florida by J. F. Whiteaves from a screech-owl (probably the race *floridanus* of *Otus asio*), but the circumstances of the find are not known. On June 25, 1939, Mr. Malcolm J. Lerch took five flies (3 ♀, 2 ♂) from the body of young flickers, bare of hair or feathers, in a nest placed in the broken stub of a dead tree, at Penn Yan, New York. No doubt the flickers were of the northern race (*Colaptes auratus luteus* Bangs).

Bionomics.—Our knowledge of the life-history and habits of *Carnus* is as yet fragmentary, some published statements being based on surmises rather than on actual observations. The adults have been bred from puparia found in birds' nests. Upon hatching, both sexes are fully winged and able to fly,[3] probably reaching new breeding places or new hosts by flight at that time, particularly when they hatch in the spring from old nests. So far as I know, however, no specimens have ever been taken on the wing in nature. Those that hatch in mid-summer, in nests occupied by young birds, probably remain there. At any rate, both sexes have been found in summer in a deälated condition on the body of nestlings, running about swiftly or hiding in the axilla. The wing breaks off some distance from the base, at the deep notch of the costa where the first longitudinal vein ends. A fairly long stump (of about 0.3 mm.) remains on the thorax. Mercier (1928) has shown that, as in the case of *Lipoptena,* the longitudinal thoracic muscles of flight are replaced in deälated specimens by adipocytes, which later are resorbed. Perhaps this tissue material of the thorax is used in part for the postimaginal growth of the internal organs of the abdomen, a conspicuous feature of deälated *Carnus.* As a result of this growth, the integument is considerably distended. The physogastric condition is less pronounced in the male than in the female, the latter eventually reaching twice the original size. The increase in size seems to call for the taking of some food by the adult fly, after it reaches the bird.

The exact nature of the diet is, I believe, far from settled. Most writers surmise or state as a fact that *Carnus* is a blood-sucking fly; but a careful study of the mouth-parts discloses none of the vulnerating structures of the proboscis of the true "biting" muscoid flies. There is, it is true, a swollen and heavily sclerotized basal portion; but this could scarcely pierce the skin, as it ends in soft labella, bearing only long, sensorial setae (See de Meijere, 1913, p. 8, figs. 5 A–B; Frey, 1921*b,* p. 151, Pl. 10, fig. 125). There appears to be none of the elaborate prestomal rods, rasps and teeth by means of which *Stomoxys* and *Glossina* cut the skin. I can find only two accounts of actual observations bearing on this subject, and they are contradictory. Nöller (1920, p. 159) describes the feeding as follows: "It is possible to keep *Carnus* alive without difficulty for three days in a Petri-dish, with a moist wad of cotton in the incubator at 25° C., feeding it once or twice a day in the axilla of long-eared owls ["Waldohreulen," *Asio otus* L.] cleared of the feathers. At the close of this period it is as hungry and bloodthirsty as when it was first taken from the barn-owl. Long series of experiments

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[3] The reduced venation certainly does not impair flight much. The species of *Lipoptena,* in which the veins are even more reduced, are good and active fliers before they drop the wings.

were not carried out, because no birds infected with *Haemoproteus* were available at the time. The act of sucking blood takes only a few minutes, after some running about under the glass-container placed on the bird. It usually begins in short order particularly if the skin of the bird has been somewhat injured through scratching with a needle." Engel (1919, p. 249), on the other hand, writes: "Most of the flies remaining on the body of the birds [nestling wrynecks, killed with ether] were attached by means of the proboscis to the insertion of a feather-quill, where they probably obtain their food. This, however, could scarcely be the blood of the young birds, but consists rather only of the secretions of the skin and of the fat exuded by the feather-quills. For the mouth-parts of *Carnus* do not seem to me built for piercing the skin of birds. Furthermore, in none of the freshly collected flies did I see blood through the membrane of the abdominal segments, such as may always be observed in engorged culicids." The presence of avian blood in the intestinal tract of fresh flies could readily be determined by microscopic examination of the contents. Meanwhile, I am inclined to agree with Hendel (1928, p. 105) that *Carnus* feeds most probably on secretions of the skin, which the fly licks or sucks after the fashion of the house-fly.

The true diet of adult *Carnus* is of particular importance in connection with the possibility that this fly might act as a biological carrier of certain avian blood-parasites. In the case of the *Haemoproteus* of the European kestrel (*Falco tinnunculus*), von Wasielewski and Wülker (1918, p. 75) believe that *Carnus hemapterus* is the intermediate host and that it infects the nestling by the bite. They offer, however, no evidence to support this claim, apart from the fact that the fly was often found on infected nestlings. They were unable to experiment with it, nor did they attempt to find developmental stages of the protozoon in the insect. From what is known of the transmission of the pigeon *Haemoproteus,* which may be identical with that of kestrel, it is more probable that a species of *Pseudolynchia* or a related genus of Hippoboscidae, is the carrier. Some such flies were also occasionally seen on kestrels by von Wasielewski and Wülker.

The deälated flies are most commonly observed on nestlings, before the feathers are developed or, at any rate, before the young leave the nest. I find 20 definite records from nestlings and only 4 that possibly refer to adult birds away from the nest. Several flies are usually found on one nestling and they are sometimes very numerous, making black patches on the skin. They often rest or hide in the axilla and, when disturbed, scurry about very swiftly with a hopping motion.

Probably most of the flies eventually die on the nestlings, but how long they live or whether they ever leave the bird after the wings break off, is not known. Mating and oviposition have not been observed. Brauer (1880, p. 117; and 1883, p. 60) claimed that *Carnus* was ovoviviparous. He gave a very brief description of the first larval instar, which, as de Meijere (1913, p. 13) points out, was based on larvae extracted from the abdomen of a gravid female. The unhatched egg, as found in the uterus of the fly, was also described by de Meijere. He surmises that several first instar larvae are voided at very short intervals. Since the puparia have been found in the nests, there can be little doubt that the several larval instars live there; but no description of them has ever been given, nor is it known what they feed on. They could be either scavengers, living off decaying organic matter, or predacious, attacking other arthropod inmates of the nest. The puparium was described and figured by de Meijere (1913, p. 17, figs. 11–12). As in all Muscoidea, it is the hardened and shrivelled integument of the last larval instar, of which it retains many of the characteristics. It is established that the insect hibernates as a puparium, perhaps the only method of surviving winter. Nordberg (1936, pp. 160–161) found in Finland that many of the flies hatched throughout July and August from starling nests after they were abandoned by the birds, but that a fair number of puparia remained to give flies next spring.

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BOOK NOTES.

Applied Entomology.—An Introductory Textbook of Insects in their Relation to Man. H. T. Fernald and Harold H. Shepard. 4th Edition. Pp. i–ix and 1–400; figures 1–383. (McGraw-Hill Book Co., Inc., New York. $3.50.)

This fourth edition of Dr. Fernald's standard work has been done in collaboration with Dr. Harold H. Shepard of the University of Minnesota. As the preface says, the seven years since the previous edition have seen great advances in our knowledge of insects and how to control them. The standard insecticides long in use are still standbys, but many new ones have come into the picture and still others, especially in the field of synthetics, seem likely to be acceptable. The newer ones, however, are discussd only if demonstrated as useful in practice. Nearly one-third of the book has been rewritten in view of important changes both in materials and observed facts. Chapters V to IX about the importance of insects and about insect control and insecticides are new. There are also numerous new illustrations. In other words, the work has been brought up to date, as is indeed necessary in such a rapidly changing department as economic entomology.

The first nine chapters deal with the fundamental generalities of entomology, including internal and external structure of insects, their development, economic importance, and the methods of control. Chapter X is on the relationships of insects. In the twenty-three following chapters the Orders are taken up serially, including their life-histories and the methods of control of the injurious ones. The last chapter, XXXIV, discusses animals other than insects, including snails, worms, sowbugs, spiders, mites and ticks.

This writer misses a reference to the common embiid in Arizona, which is said to have been brought here with date palms from Egypt. However, it is of no economic importance.

The book, as usual with McGraw-Hill publications, is extremely well-printed on good book paper; and is bound in stout buckram.

On the whole, it will be found a very useful introductory text, presenting in condensed form, but clearly the fundamentals of applied entomology.

J. R. T.-B.

PROCEEDINGS OF THE SOCIETY.

Meeting of April 16, 1942.

A Regular meeting of the Brooklyn Entomological Society was held at the Brooklyn Museum on April 16, 1942, at 8:00 P.M. with Mr. McElvare in the chair. Members present were Messrs. F. T. Naumann, G. P. Engelhardt, E. W. Teale, R. R. McElvare and A. T. Gaul. Visitors included Dr. Daniel Ludwig, Dr. Henry Fox, Mr. and Mrs. J. H. Wilmoth, Mr. Felix Wriblewski and Mr. Anton Odink.

The minutes of the preceding meeting were read and approved. The treasurer delivered a brief report on the satisfactory financial status of the society.

Mr. Teale showed about thirty specimens of abnormal egg masses of the praying mantis. Some of these were double, triple and with other variations.

Mr. Engelhardt exhibited specimens of the hemlock moth *Feralia jocosa* which has appeared in numbers in Westchester county for the first time in ten years. He also showed a nearly apterous female and a melanotic variation of *Phigalea titea,* Cramer. He further exhibited an undetermined case bearing Micro-lepidopteran which is common under the bark of tulip trees.

Dr. Daniel Ludwig, guest speaker, discussed "The Effect of Relative Humidity on the Early Development of Saturniid Moths." He pointed out that humidity investigation has been developed only within the past ten years.

No living organism can survive without water, and terrestrial insects have developed four means of securing water. By drinking it directly; by consuming food with a high water content; by utilizing metabolic water produced in the oxidation of carbohydrates and by direct absorption from moist air.

Insects which devour food of low water content, such as the granary weevils, have a water content of about 46% of their total body weight. Larvae of phytophagous moths have a water content varying between 80% and 90%.

Insect eggs may be divided into two groups according to their humidity requirements. First there are those eggs which require a large amount of moisture, and which must absorb enough water to effect a noticeable swelling before development can proceed; scarabaeid eggs are in this category. Second there are eggs which may imbibe water from a moist atmosphere, but which will develop just as well in very low humidities, the eggs containing enough water for full development at the time of oviposition. The egg of the Promethea moth for example will maintain a constant weight at 100% R.H.; it will lose weight at 0% R.H. but will develop successfully nevertheless.

There are two optima in respect to the effect of temperature on egg development. The physiological optimum at which development occurs most rapidly, and the ecological optimum at which survival is greatest over the widest range of humidities. In the case of the Promethea moth egg, the optimum humidity is near 76%; the physiological optimum temperature is 30 degrees C. while the ecological optimum temperature is at 25 degrees C.

Temperature definitely conditions the humidity responses of eggs. The weight and water content of an egg is determined by the temperature and the relative humidity. Low humidity prolongs the egg stage when the temperature varies from the physiological optimum.

Eggs of the Cecropia moth hatch at higher temperatures than the Promethea. Polyphemus eggs can hatch at 32.5 degrees C. Their development requires only seven days, so they are well adapted to withstand trying humidity conditions as they have no chance to dehydrate before development is complete.

The rate of dehydration of eggs in low humidities varies directly with the size of the egg and with its surface area.

The effect of the cocoon on pupae is very slight. It cannot retain heat or prevent dessication. It may buffer the pupa against sudden changes however.

Moths which emerge from pupae kept in dessicated air cannot produce the normal number of eggs. Eggs thus produced however will develop normally.

A short discussion followed the lecture, and the meeting adjourned at 10:00 P.M.

A. T. Gaul,
Secretary.

Insects

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OF THE

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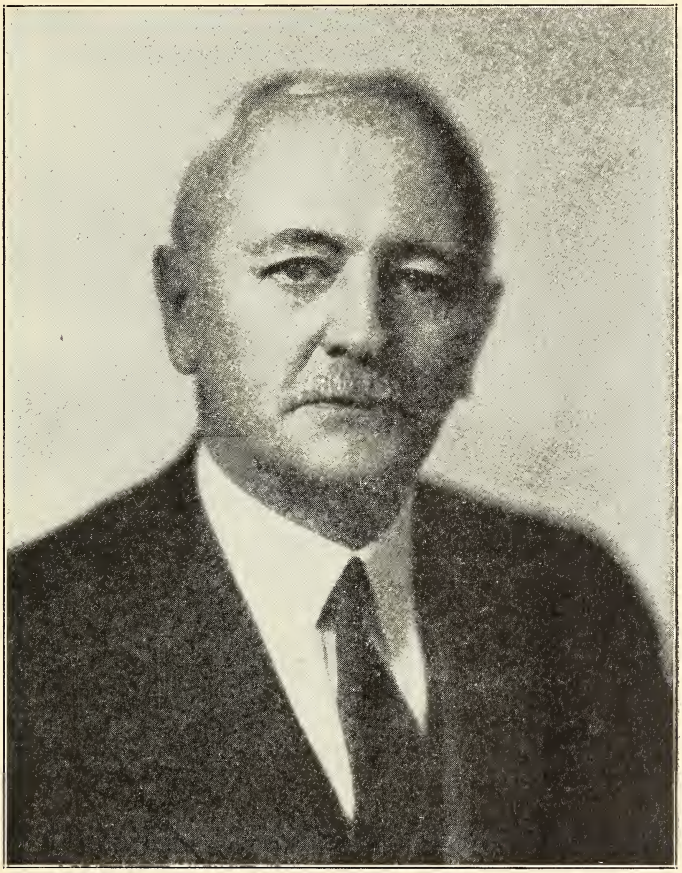

George Paul Engelhardt
1871–1942

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RESOLUTIONS ON GEORGE P. ENGELHARDT.

On Sunday, May 24, 1942, George Paul Engelhardt passed away.

For more than thirty years he was a member of the Brooklyn Entomological Society and as one of its principal officers gave unselfishly of his time to the best interests of the Society and of American entomology generally.

Acquainted at first hand with the varied faunal life of the United States, he was a naturalist of broad experience. He was particularly gifted as a field entomologist and in the Aegeriidae, his chosen group, a recognized authority.

He embodied in his home and family life the spirit of gentleness and devotion, and in his modesty, his quiet dignity, his sympathetic understanding and encouragement of youth he stands as the type of man esteemed by us all.

We are deeply indebted to him for his effective service to the Society and feel his loss very keenly.

Therefore, Be it Resolved that the members of the Brooklyn Entomological Society record their profound sorrow at his death, and be it further

Resolved, That these resolutions be spread upon our minutes and that a copy be presented to his family.

George S. Tulloch
Rowland R. McElvare
Wm. T. Davis
Albro T. Gaul
Edwin Way Teale

GEORGE P. ENGELHARDT.

By Edwin Way Teale, Baldwin, L. I., N. Y.

The sudden death of George Paul Engelhardt, on Sunday May 24, 1942, deprived the world of its outstanding authority on the *Aegeriidae.* It also deprived entomologists, here and abroad, of a friend who was respected and loved.

At the age of 70, his enthusiasm for his work, his interest in the welfare and progress of younger entomologists, his passionate enjoyment of collecting trips afield, remained as fresh as in younger years. Only a few days before his death, he was planning a new expedition into the field with Rowland R. McElvare, a companion on many previous trips. Always, while searching for the clear-winged moths, his own specialty, he was on the alert for other insects which would make valued additions to the collections of his many friends.

Probably few men in America had greater first-hand knowledge of the natural history of the various sections of the United States than Mr. Engelhardt. He had collected extensively in all parts of the country. Often, he was accompanied by entomological friends on these trips afield. In 1931, William T. Davis was his companion on a jaunt through the Southwest to California. Three years later, he joined E. P. Van Duzee on a trip by car up the West Coast. In 1937, he and Alexander B. Klots visited Colorado and Arizona. In 1937, and again in 1938, he accompanied Rowland R. McElvare on collecting trips that carried them to Florida, Alabama, and along the Gulf. Charles W. Leng joined him on an expedition to Labrador in 1912. At other times, he made trips to Alaska, Europe, Central America and British Columbia.

A curious twist of luck, the sort of twist that makes insect-hunting such a fascinating hobby, led him to undertake the British Columbia trip. A correspondent sent him a clear-winged moth of a species with which he was unfamiliar. It was marked "British Columbia." Writing to friends in that Northwestern province, Mr. Engelhardt asked them to be on the lookout for other specimens. They replied that the insect was unknown to them. A few years later, to search the area himself, Mr. Engelhardt made a journey of more than 6,000 miles. His efforts were fruitless. Nearly resigned to the fact that his collection would have but a single specimen of this species, he moved to Hartsdale, a suburban community near New York. Looking over the Virginia Creeper on his newly acquired property, he noticed a borer at work in the vine. Cutting out a

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section he waited until the adult moth appeared. When this insect, brought from just outside his own doorstep, was closely examined, it was found to belong to the rare and long-sought species.

In collecting and studying the *Aegeriidae,* Mr. Engelhardt was far more than a classifier of dead insects. He well recognized the truth of the saying of Benjamin Franklin's Poor Richard: "What signifies knowing the names if you know not the nature of things?" He went beyond mere identification and species-naming. His work embraced the whole biology and ecology of the *Aegeriidae.* He sought to understand all the threads in the particular section of the web of life in which these insects play their part. In this work, his knowledge of botany and allied sciences in the field of natural history aided him greatly. His background of knowledge and his inclinations joined together to make him outstanding as a field entomologist.

Training for his life-work began early; his interest in natural history in general and in insects in particular dates from boyhood. The son of Heinrich and Berta (Heine) Engelhardt, he was born in Hanover, Germany, on November 23, 1871. His father was in government employ. In 1889, after completing his education at the gymnasium in Baden-Baden, young Engelhardt came to America. Soon afterwards, he became an American citizen.

Living with an uncle in New Orleans, La., he worked for several years as a salesman for a wrapping-paper company. By 1900, however, his bent for natural history pursuits had led him to a place in the entomological department of the Kny-Scheerer Company, a New York biological supply house. Here he remained for two years, leaving to accept the post of maintaining and developing the natural history collection at the recently established Children's Museum, in Brooklyn. Following a decade of fruitful labor in this position, he became Curator of Natural History at the Brooklyn Museum. He remained in this place until 1930 when he retired as curator emeritus. His marriage to Edith F. Bliss, in 1906, was an exceptionally happy union. George Bliss Engelhardt, their only son, is a research engineer with the Bell Laboratories, in New York City.

During the years he was busy with museum work, Mr. Engelhardt had opportunities to come in contact with many young men and women who possessed a native interest in natural history. His inherent kindliness and helpfulness encouraged many of these beginners to go on to a serious study of entomology. Among them was Foster H. Benjamin who later became Assistant Entomologist to the State Board of Mississippi, Curator and Collaborator in

Publications for the William Barnes Collection of Lepidoptera, at Decatur, Illinois, and a specialist in Lepidoptera at the National Museum, in Washington, D. C.

Among the many scientific societies of which Mr. Engelhardt was a member, are the New York Academy of Sciences, the New York Entomological Society and the Brooklyn Entomological Society. For more than twenty-five years, prior to his death, he acted as treasurer of the latter organization. His devotion to the detailed work of this office, and to the voluminous correspondence incidental to the business phases of putting out the *Bulletin of the Brooklyn Entomological Society, Entomologica Americana,* and the various volumes which have appeared under the imprint of the society, went far in enabling this relatively small group to maintain its unbroken record of publications during years of financial stress. In addition, during his extensive travels, his friendly interest and contagious enthusiasm made him a sort of good-will ambassador for the societies to which he belonged.

Mr. Engelhardt contributed extensively to scientific journals. The monograph on the *Aegeriidae,* to which he had devoted nearly forty years of study and field research, was completed at the time of his death. It will be published next year under the auspices of the National Museum. During the years 1939, 1940 and 1941, Mr. Engelhardt spent the winters at this Washington institution, arranging and classifying the *Aegeriidae* there, and in extensive research, in which his friends Gates Clark and Heinrich were active in assisting him. His own great collection, comprising about 175 different species, has been presented, by the terms of his will, to the National Museum.

"American Men of Science" gives this brief sketch:

> *Zoology.* Hanover, Germany, Nov. 23, 71. Gym. Baden-Baden, 86. Asst. Curator, Children's Museum, Brooklyn, 02–13; curator invertebrates, Brooklyn Museum, 13–30, dept. nat. science, 19–30, hon, curator, 30–; sec'y dept. zool, Brooklyn Inst, 12–19. In charge zool. expeds, southwest. Utah, 04–17; Guatemala, 08; Newfoundland and Labrador, 12; Bahamas, 14; Pacific Coast of the U. S., 16; Socorro Island, Mex, 29; Great Bend, Texas, 31. A.A; Soc. Ichthyol. and Herp; Entom. Soc. Amer; N. Y. Entom. Soc; Brooklyn Entom. Soc. Marine invertebrates; metamorphosis of the amphibians of Long Island; Aegeriidae of North America; herpetology; entomology.

BIONOMICS OF CATORHINTHA MENDICA STAL (COREIDAE, HEMIPTERA).

By W. V. Balduf, Urbana, Illinois.*

This large common native American coreid bug, described 72 years ago from Texas and Mexico by Stål (1870), has received only scant and incidental attention from investigators to date. Blatchley (1926) assembled most of the published references and stated his personal observations on its occurrence and food plants in Indiana. My study of its bionomics was made largely in the general vicinity of Urbana, Illinois during the years 1940 to 1942. Being monophagous on a plant whose physiological states vary sharply by seasons, this bug illustrates in an unusual degree the influence food plants may exert on insect development. For descriptions of the several stages, see the next article, by James S. Slater, in this Bulletin.

Food Plants.

Although Hart reported *Catorhintha mendica* "common on *Rhus aromatica, Allionia nyctaginea* and a variety of other plants" in the sand areas of western Illinois, he did not necessarily intend to state that it fed on any or all of them. Blatchley definitely associated the bug with *A. nyctaginea,*—the heart-leaved umbrella-wort or wild four-o'clock, as the "host plant." In all my observations in Illinois and at several points in northern Indiana and Ohio, I found it only on this wild four-o'clock. Neither nymphs nor adults were taken in sweeping non-nyctagineaceous plants growing among or adjacent to *Catorhintha*-inhabited *nyctaginea,* and not only the nymphs and adults were frequently seen in numbers only on the leaves and flowers of this plant but also many eggs were found laid on it. The occasional occurrence of a nymph or adult on other plants than *nyctaginea* does not invalidate the conclusion that the species is monophagous on *nyctaginea* in the area investigated. It is possible that *mendica* will eventually attack our ornamental four-o'clock, or Marvel of Peru, *Mirabilis Jalapa.*

The technical names mostly applied to the wild plant to date are *Allionia nyctaginea* Michx. and *Oxybaphus nyctagineus* (Michx.). In a recent critical study of the *Allionia* complex of the Americas,

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* Contribution No. 232 from the entomological laboratories of the University of Illinois. I am indebted to my botanical colleagues, Doctors L. R. Tehon, H. J. Fuller and G. N. Jones for technical information concerning the food plant of *Catorhintha.*

Standley (1931) discovered intergrading forms from which he concluded that the generic concepts formerly held are no longer tenable. Accordingly he reduced them to a single genus under the name *Mirabilis*. The name of the food plant of this *Catorhintha* therefore becomes *Mirabilis nyctaginea* (Michx.).

FEEDING AND SHELTER.

The large nymphs and the adults rest and feed largely on the succulent upper leaves and on the flower parts, which are terminal. There they are readily and commonly seen. But on hot sunny days they descend to the shaded leaves and stems, or even sit on the intermingled non-nyctaginaceous plants. Again, when *Mirabilis* is in flower or seed, the nymphs of the first and second instars hide, and probably also feed, entirely from external view within the involucral bracts that enclose the flower clusters or seeds. The more advanced nymphs are too large to take refuge thus. For example, on the hot bright afternoon of June 15, 1942, I at first gained the impression that no nymphs had developed, but on opening the involucres found them numerous within, as many as six individuals of the first and second instars hiding in a single circle of bracts. Since this situation affords both food and shelter, it is likely that the small nymphs live there most of the time that involucres occur. This likelihood is rendered all the more plausible by the fact that the two seasons in which small nymphs occur in large numbers—namely May–June and August–September, are simultaneous with the prevalence of involucres. The practice of hiding thus has a practical bearing in the work of taking samples, for it is probable one does not secure by sweeping, a proportionate number of the smaller bugs during the long periods when the plant bears involucres.

DISTRIBUTION.

Inasmuch as the distribution of both *mendica* and *nyctaginea* are still being investigated, it will suffice here to note that both these organisms seem to have originated in southwestern United States or northern Mexico, and have subsequently spread northward and eastward into Iowa, Nebraska, South Dakota, southern Minnesota, Illinois, Indiana, Ohio and doubtlessly other states adjacent to these. Both plant and bug seem still to be actively spreading eastward, the insect following in the wake of its food plant, which has appeared in Connecticut, whereas *mendica* has not yet been reported east of Ohio. In east central Illinois, I have found both organisms plentiful, yet still confined almost entirely to the well-drained parts of railroad embankments. This fact suggests that *nyctaginea* was disseminated by trains carrying the seeds in grain or live stock cars, and that *mendica* trailed along some time later after the plant had established itself in new frontiers. However, in areas long occupied, both plant and bug have, in all probability, moved from the railroad banks into such suitable situations as lie adjacent to them.

DEPENDENCE OF *mendica* ON *nyctaginea.*

Because *C. mendica* seems to be monophagous in the Urbana area, its seasonal populations, if not also the number of generations per year, are directly and drastically affected by the growth and reproductive habits of its food plant, *M. nyctaginea.* This marked dependence was strikingly apparent in each of the three years in which this investigation proceeded, and is probably a regular annual occurrence, but with variations in intensity from year to year. The statement which follows is based on data taken in 1941, unless otherwise noted, when weekly samples of the bug and notes on the developmental state of the food plant were taken from May to November.

Mirabilis nyctaginea formed new shoots from wintered taproots about the middle of April. In 1942, the first new growth appeared in the week of April 12–19. The new plants became full grown by June 1, but flower buds developed earlier, followed by deep pink flowers, some of which persisted past the middle of June. By mid-July, most of the seeds had been produced and dropped in east central Illinois. Then in late June and early July, simultaneous with the maturity of the large yield of sizable, hairy, ribbed seeds, the stems and branches became woody and lost their sap, and, particularly in the somewhat drier summer of 1941, dropped most of their leaves. When the food plant had reached this state, *C. mendica* had attained a large nymphal population, that originated from the eggs deposited by overwintered adults. Still requiring much food to complete their development, the nymphs supposedly were able to obtain no more sap, or an insufficient quantity or quality of it from the plant, with the direct and prompt result that large numbers of them died of starvation.

The factual basis for this general deduction is found in the data from field samples. The weekly collections taken from June 5 to 28, when *mendica* was still flourishing on the still more or less succulent food plant, totalled 433, 658, 372 and 490 individuals, respectively, or an average of 488, whereas the sample of July 4, when *nyctaginea* was most desiccated and defoliated, consisted of only 77 bugs, or approximately 16 per cent of the average for June.

Similar dependence of *mendica* on *nyctaginea* was observed also during the rest of the summer and in the fall. Having completed its seed production, *nyctaginea* made a complete vegetative recovery from July 11–26, involving the growth of many new leafy branches from the upper axils and numerous clusters of flower buds and involucres. This verdant, succulent, nutritious condition persisted into October, probably because most of the buds never developed into flowers or seeds. Following this recovery at a distance of several weeks, *mendica* restored its population to its former mid-June level. Whereas the samples of July 11 to August 9 contained 50, 22, 58, 14 and 6 bugs, respectively,—mostly adults, or an average of 30 individuals, those taken from September 19 to October 25 numbered 101, 451, 219, 318, 326, 472 and 219, respectively, or an average of 301, or an increase of 900 per cent over the population of midsummer. These peak numbers of autumn themselves suffered a decline from latter October to early November. Two causes operated to effect this result. First, as adults developed and stored reserves in their adipose tissue, they left the food plant, and second, a considerable number of nymphs starved, for *nyctaginea* had again turned woody, dry and leafless on October 25. Whereas 219 bugs were taken on the latter date, only 34 formed the sample of November 3, and none remained available by sweeping *nyctaginea* on November 14.

It therefore seems conclusively demonstrated that the population of *mendica* fluctuates with the seasonal reproductive and vegetative processes of its food plant. These numerical fluctuations are so prompt and extreme because the bug places its entire dependence on *nyctaginea* and because the latter itself is characterized by sharp elevations and slumps in contents of sap, which forms this insect's food.

ENEMIES.

Although eggs, nymphs and adults from the field were caged, numerous nymphs examined with a binocular microscope and hundreds of adult females dissected, no conclusive evidence of parasitism was found in the course of this investigation. However, the abdomen of an occasional adult bug bore externally an elongate-oval, cream-colored convex body about a millimeter long, which was perhaps the egg of a parasitic dipterous fly. Although the attached ventral wall of these bodies and also the cuticula directly beneath it had been perforated, suggesting a larva had hatched and entered the body cavity of the bug, no such larva was ever found by dissection. Moreover, no predatory enemies of any kind were found.

MATING.

Although the adult bugs are numerous and readily seen on the food plant, I have noticed the mating posture but once. This fact suggests that the copulatory act is brief and the bugs quickly disjoin when disturbed. In the one case observed in northern Ohio, on June 7, 1941, the paired couple rested on the upper surface of a leaf of *Mirabilis,* the caudal ends united and the bodies in linear position, *i.e.,* the heads extended in opposite directions.

OÖGENESIS AND OVIPOSITION.

The submature oöcytes are elongate-oval but when they reach the base of the ovarioles have become elongate six-sided. Soon after passing to the paired oviducts they change from white to dark dull brown. The paired ducts as a whole serve for storage of the mature eggs, being fitted for this function by their extreme length, flat form, great flexibility and transverse corrugations. These features give the ducts a superficial resemblance to tapeworms. All numbers of eggs up to 20 may occur in each duct, but the higher numbers cause the ducts to stretch and, moreover, to become extremely kinked. The latter condition is, I believe, due to the restraining pull exerted on the ducts by the tracheal branches that permeate their walls. The short median oviduct bears dorsally a complexly constructed spermatheca, and laterally near the apex a dark reddish spongy bluntly-ramose organ, which is presumably the cement gland.

Of a collection of 156 eggs removed from *Mirabilis* afield on June 1, 1942, all but two had been stuck fast to the outer faces of the bracts that form the numerous involucres then present at the termini of the branches. The other two were on a tender leaflet about 4 inches below an involucre. The eggs are therefore laid on the parts from which the females, and other forms of *mendica* obtain their liquid food. The 156 eggs appeared in lots composed of one to six eggs each, as follows: two lots of one egg each, 26 of two each, 25 of three, four of four, one of five and one lot of six eggs. Masses containing three or more eggs have them arranged in two to four flat horizontal tiers, the number of eggs forming them decreasing from bottom to top. Further, the eggs of each tier usually lie with their lateral faces in full contact or juxtaposed, and the cephalic or caudal ends of all are directed in one way and flush with each other.

Where two eggs form a mass, they may lie with lateral faces juxtaposed, or one superior and flat on the other. If the substratum is uneven in any way, the arrangement of the eggs in the mass is correspondingly irregular.

INCUBATION AND HATCHING.

Eggs laid on a caged *Mirabilis* required seven days for embryogenesis, and the last of the 156 eggs referred to above likewise hatched in six to seven days. Upon emerging, the embryos either push the oblique terminal subquadrate operculum free from the rest of the chorion or leave it attached by more or less of its margin to the edge of the aperture. In either case it rolls up somewhat at the edges, indicating it is thin and flexible in structure. Some embryonic membranes remained partly inserted in the aperture, while others lay near it, showing the embryo molts to the nymphal form as, or soon after, it issues from the chorion.

THE WINTERING STAGE AND HABITAT.

I have two kinds of evidence that *C. mendica* passes the winter as adult. First, whereas some adults taken September 19 to October 5, inclusive, were gravid and plainly mature in color and hardness, all the females obtained from October 10 to 25 were obviously young, as the nonfunctional state of the ovarioles and the pale soft bodies indicated. In other words, the old reproducing females died before November and the new young females remained sexually inert until spring. Second, collections made in the spring of 1941 and 1942 demonstrated that no stages other than adults of the species appear on the food plant early in the season. Samples taken on May 17 and 23, 1941, consisted entirely of adults, and in 1942, when searches were begun on March 16, only adults occurred on *nyctaginea* from May 2 to 20. Young nymphs in the first and second instars had first made their appearance in numbers on June 1.

Two other field records not my own confirm the fact that the adult winters and likewise bear on the question of winter habitat. Weese (1924) found an adult on October 3, 1921, in the edge of Trelease Woods, and C. O. Esselbaugh, whose present researches at the University of Illinois involve regular collections in Brownfield's Woods, took a female adult on *Aesculus* near the forest margin on April 27, 1942. These instances hint that *mendica,* like many other insects of the open field, migrates into the forest margin in autumn and departs from it again in the spring. Supporting this suggestion are three other facts. First, *nyctaginea* seems still to be restricted very largely to railroad embankments, hence the *mendica* that appeared in woods margins probably migrated distances of one to two miles from points in the open countryside. Second, although many young adults were developing on *nyctaginea* along railroads in October, 1941, the adult population did not increase there, indicating the imago promptly forsakes the railroad embankment and its food plant after it has stored up a reserve of nutriment in the adipose tissue. Third, the adult bugs appeared tardily on *nyctaginea* in the spring of 1942. Whereas the new shoots sprouted in the week before April 25, *mendica* came back to it during the week following. Moreover, their numbers were very small as compared with the population existing in the same spots in the previous fall. This reduction could, of course, be due to the effects of winter rather than failure to refind the food plant in case they passed the cold season in distant woods. That some mortality results from migration is suggested by the observations that many more adults reappeared in May, 1942, on *nyctaginea* growing along a railroad adjacent to a forest than where the food plant grew along a railroad passing distant from forests. In both situations the bug was abundant in the fall of 1941.

GENERATIONS.

My investigations lead me to believe *mendica* completes two, or possibly three, generations yearly in east central Illinois. The first begins with the overwintered adults that reappear on the food plants on railroad embankments in late April and early May. The last of these died on about June 29, 1941, and June 15, 1942. That the wintered females commence laying eggs as soon as they return to *nyctaginea* is shown by the presence of good numbers of mature eggs in the paired oviducts of all females taken on May 2, 1942, the first date on which adults could be found. This fact is of interest in that it indicates spring feeding on *nyctaginea* is not essential to oögenesis, and that the ovarioles probably utilize instead the green adipose matter remaining in the body cavity from the previous fall. Eggs were found in maximum numbers on the food plant on June 1, 1942, and a few remained there unhatched on June 15. On June 1, all the many nymphs present were in the first and second instars, and by June 15, 1941 and 1942, respectively, the nymphal development had progressed as the following analyses of large samples taken on that date show: first instar, 7.0 and 3.0 per cent; second, 20.0 and 15.0; third, 35.0 and 37.0; fourth, 31.0 and 28.0, and fifth, 7.0 and 19.0 per cent. While the nymphal population still remained high on June 28, 1941, but little advance in growth had been made by that date. On July 4, not only had the number of nymphs fallen off sharply but the percentage of adults increased remarkably to 63.7 from 6.52, where it stood on June 28, showing that the adult, with its storage of reserves, seems to tolerate and survive better than the nymphs the food shortage of those dates.

This decimation resulted in the extremely low population of both nymphs and adults present from July 4 to at least August 9, 1941. The adults at hand during this summer period represent the climax of the first generation and form the parental stock that initiated the second cycle of the year. Because the food plant recovered vegetatively in latter July, 1941, following the maturity of the seed crop, the second generation of *mendica* flourished in September and October, as had the first in May–June. Analysis of the collection of 451 individuals taken on September 19–20, indicate the progress this generation had then made: first instar, 9.1 per cent; second, 15.54; third, 34.85; fourth, 15.76; fifth, 0.66; adults, 24.20 per cent. On September 27 and October 5, nymphs in the third instar continued to predominate in numbers, while on October 11 and 18–20, the fourth instar nymphs constituted the largest per cent, but were followed closely by those of the fifth. The climax of nymphal development was reached on October 25, when the percentages stood at 0.91, 3.19, 12.31, 28.27, 41.04 and 14.3 for the five nymphal instars and adult, respectively. Although the population fell off sharply, due to cold weather and desiccation of the food plant, between October 25 and November 3, as indicated by the 219 and 34 bugs constituting the respective samples of those dates, the fifth instar nymphs continued to predominate. The persistence of first instar nymphs throughout late October and until November 3, and the discovery of a single mature brown egg in a young female otherwise sexually inert on October 25, indicate *mendica* is an opportunistic, indeterminate species, growing and reproducing until halted by unfavorable weather and absence of food.

Finally, the adults of the first generation gradually died off from September 19–20, and earlier, until none remained on and after October 11. At the same time, 40 per cent of the adults found on September 19–20 were new and young, and from October 11 to 25, only such imagos were taken. These enter the winter in a sexually inert state, and oögenesis begins the next spring before the bugs reappear to feed on *nyctaginea*.

If a third generation should prove to characterize *mendica* here, I venture to suggest it develops in July and August, when the population is at a low figure, and weekly samples are therefore so small as to give insufficient and unreliable indication of its occurrence.

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Note on Multareis Planifrons Van Duzee.—*Multareis planifrons* Van Duzee (Homoptera, Membracidae) was described from California in 1923 but has never been mentioned in the literature of the family since its original description. It is apparently a rare species and is seldom seen in collections; we have seen only one specimen from any other locality than California and that was a single specimen collected by Dr. J. C. Bradley at San Carlos, Arizona, in 1918. Nothing has ever been reported regarding its life history.

In April, 1942, the writer collected a good series of 48 males, 12 females and 22 nymphs of this unusual species on creosote bushes (*Larrea divaricata* Cav.) in a very limited area in Tucson, Arizona. Egg-slits were numerous on the twigs but none contained eggs, indicating that the eggs had hatched some time before, and the nymphs represented only the last two instars. Apparently it was a little too late in the season to secure the earlier stages. This is a new locality record and there is no question but that creosote is a definite host plant.—W. D. Funkhouser, University of Kentucky, Lexington, Ky.

INCISALIA HENRICI IN FALL RIVER, MASSACHUSETTS.

By W. Prescott Rogers, Fall River, Mass.

There have been reported in New England so few colonies of this little lycaenid that an account of its appearance locally may be of interest to collectors elsewhere.

Mr. Klots recorded in 1935 a good catch near his home at Putnam Heights, Connecticut. Mr. L. P. Grey of Lincoln, Maine, has had favorable collecting at various times. Farquhar's unpublished check list, now deposited at the New England Museum of Natural History in Boston, reports this genus from scattered localities in New England. Until the studies of the life histories of the *Incisalia* group were published in the Canadian Entomologist by Mr. John H. Cook in 1905, 1906 and 1907, the insect was rarely identified by the contemporaries of Dr. S. H. Scudder.

In the Fall River region where huckleberry, high and low bush blueberry have favorable growing conditions this butterfly has been taken in *single* specimen captures at several different points. From 1935 to 1941 diligent searches have repeatedly been made on favorable collecting days at the points of original capture. With the exception of the locality designated as the Water Tower Hill area there has not been one instance where the species was taken a second time.

April 29, 1935—A male was captured at the Water Tower Hill in Fall River. This is high land with excellent growth of scrub oak blueberry and huckleberry. The insect was taken at noon on a high-bush blueberry bordering a sunny path. The same day in Touisset, Massachusetts, a male was taken on blueberry beside a path sheltered by cedars, scrub oaks and pines. Again on May 9th and May 13th a female on each occasion was taken at the Water Tower. On the 16th of May at Myricks, in a sheltered area on low blueberry bushes, a female was captured in company with *I. augustus*.

In 1936—A male was caught on both May 5th and May 12th at the Water Tower.

In 1937—On a sunny path in a cedar grove at Tiverton, Rhode Island, a single female was taken.

Nothing was accomplished on account of unfavorable weather conditions in either 1938 or 1939. In 1940, at Tiverton Four Corners, Rhode Island, on May 11th a female was taken on an open path in a field where blueberry bushes and oaks were the predominant shrubbery.

In 1941, at the Water Tower on May 6th, two superb males were netted. On the 11th at Assonet, Massachusetts, on a shaded path where shadbush and huckleberry bushes were growing in profusion, a female was taken.

Mention is made of repeated visits during succeeding seasons to the localities where earlier captures occurred. During these six years the earliest capture occurred April 29th and the latest in any season was on May 18th. The period of flight of the insect is brief. The prevailing weather conditions in New England are generally unfavorable during the first three weeks in May, so that may explain in part the scarcity of the butterfly. The conclusion seems logical that *I. henrici* is distributed widely enough with us in the vicinity of Fall River, but until we are fortunate enough to discover a colony the insect is uncommon.

A Bibliographical Note on Aquatic Hemiptera used as Food in Mexico.—It has been well known since the earliest times of the Spanish Conquest of Mexico that in the lakes and ponds about Tenochtitlán, the Aztec capital, multitudes of insects were a common food-crop. This source of food and use of insects persists to this day; and the insect eggs are systematically cultivated, collected and sold in the markets of Mexico City at the proper season. The eggs (and some of the insects) are dried and made into cakes; or are used as a seasoning.

A very complete account of this has just reached me, here noted for the attention of entomologists. It is a lengthy article by L. Ancona H., of the Mexican Instituto de Biologia, under the title *"El Ahuautle de Texcoco"* (Anales del Instituto de Biología, 1933; vol. IV, no. 1, pp. 51/69, figures 1–17). This paper is a detailed study of the ecology of shallow Lake Texcoco, and of those smaller ones, ponds and canals near Sochiaca, Chimalhuacán, Xochitenco and to the hacienda of Chapingo. Four fishes are listed, with 4 batrachians and 17 aquatic insects. The water plants identified are 12; and also a great number of other forms, including microscopic plants and animals.

The chief sources of "Ahuautle" appear to be four corixids and one notonectid. The author has partially worked out the life histories of *Krizousocorixa femorata* Guérin, *K. azteca* Jacz. and *Notonecta unifasciata* Guérin. I say "partially" advisedly, since he enumerates only *four* nymphal instars for the first two, and only *three* for the last, which differs from the general observation of *five* nymphal instars in waterbugs as well as in the land forms, with very rare exceptions. There are nine original figures of the bugs named —eggs, nymphs, and adults. The first eight figures show the manner of collecting the crop. A partial bibliography of 18 titles closes the paper.

This is by far the best and most extensive study ever made of these bugs in their natural surroundings—perhaps the only one published.—J. R. de la Torre-Bueno, Tucson, Arizona.

Domicile of the Type of the Heliothid Moth, *Melicleptria pulchripennis* Grote.—The "List of Types in the Collection of Lepidoptera of Dr. Herman Strecker" published in Supplement No. 3 of his Lepidoptera, Rhopaloceres and Heteroceres, contains the following at the bottom of page 34: "Melicleptria Pulchripennis Grote. Proc. Bost. Soc. Nat. Hist. XVI. p. 241, 1874. Two examples, Califa. Museum, Comp. Zool. Cambridge, 1876, through Dr. H. Hagen."

The two examples in his collection, referred to by Strecker as types of *M. pulchripennis,* received from Dr. Hagen in 1876, are actually a male specimen of *Heliosea pictipennis* Grote and a female *Heliosea fasciata* Hy. Edw. (*H. fasciata* is probably only a color form of *H. pictipennis*).

In an interesting reply to an inquiry about the type of *pulchripennis,* Dr. Nathan Banks writes from the Museum of Comparative Zoology, "The type of *Melicleptria pulchripennis* Grote is here. The label on it is $\boxed{\begin{array}{c}\text{4380}\\ \text{Califor.}\end{array}}$ as is given in the original description; it also has another label "Peab. Acad." Evidently the type was returned to Packard. After Packard left the Peabody Academy of Salem, there was no one to attend to the insects so in a few years Hagen (the curator here) was asked to bring what was worth saving here. Later Henshaw went to Salem and brought some more. There was evidently but one specimen. In 1876 that type had not been brought here, so it is manifest that Hagen could not send it or loan it to Strecker. There evidently were some specimens of the Heliosea which some one here had labeled as *pulchripennis* and Hagen sent or lent the two in Chicago. There were exchanges with Strecker. . . . The type agrees with the description and we have specimens of the species from other sources."—Rowland R. McElvare, Port Washington, L. I., N. Y.

TWO NEW SPECIES OF ALLOTROPA (PLATYGASTERIDAE, SERPHOIDEA) PARASITIC ON THE COMSTOCK MEALYBUG.

By C. F. W. Muesebeck, Washington, D. C.

The two new parasites of the Comstock mealybug described in this paper are apparently of Japanese origin. The first was introduced into the United States by the Bureau of Entomology and Plant Quarantine and liberated in certain areas infested by the mealybug; but the other seems to have entered accidentally, the first specimens received for identification having been reared from samples of the Comstock mealybug collected in New Jersey.

Allotropa burrelli, n. sp.

In general appearance this species closely resembles the two described Nearctic species, *ashmeadi* Muesebeck and *utilis* Muesebeck, but it is immediately distinguished from both by the conformation of the antennae. The first funicular segment of the female is stout and barely half as long as the pedicel whereas in *ashmeadi* and *utilis* it is slender and about as long as the pedicel. In the male of *burrelli,* funicular segments 2–6 are unusually short and more or less truncate at the apices; in the other two species they are much lengthened and attenuated apically.

Female.—Length about 1 mm. Head viewed from in front subtriangular, narrowing strongly below the eyes; vertex closely, finely reticulate punctate; occiput carinately margined and irregularly, transversely sculptured; frons sculptured like vertex except immediately above insertion of antennae, where it is finely transversely lineolate; cheeks delicately, transversely aciculate; antenna as in Fig. 1, A.

Mesoscutum uniformly reticulate punctate, more coarsely so than vertex, and with short, appressed pubescence, shining; scutellum strongly convex, largely smooth and shining, shallowly punctate basally; propodeum with a high median longitudinal ridge, and with its median length barely one-fourth its apical width; outer margin of anterior wing distinctly ciliate.

Abdomen narrower than thorax; petiole conspicuous, coarsely, longitudinally striate; first segment of gaster much broader than long, even more coarsely, longitudinally striate than petiole; second tergite longitudinally striate medially at base.

Black; antenna yellowish brown, the club and scape somewhat darker; legs yellow, anterior coxa piceous, usually middle coxa, middle tibia except basally, and all femora more or less infuscated.

Male.—Essentially like the female except in the strikingly different antenna (Fig. 1, B), and in having the posterior tibia largely infuscated.

Type locality.—Batesville, Va.

Host.—*Pseudococcus comstocki* (Kuw.).

Type.—United States National Museum No. 56441.

Described from many specimens of both sexes reared by G. Haeussler at Batesville, Knowlesville, Covesville, Greenwood, Berryville, and Hollins, Va. Material of the same form reared from *Pseudococcus comstocki* at various localities in Japan has also been studied. This species is named for R. W. Burrell, of the Bureau of Entomology and Plant Quarantine, whose biological work on mealybug parasites in Japan has contributed much to our knowledge of the genus *Allotropa.*

Allotropa convexifrons, n. sp.

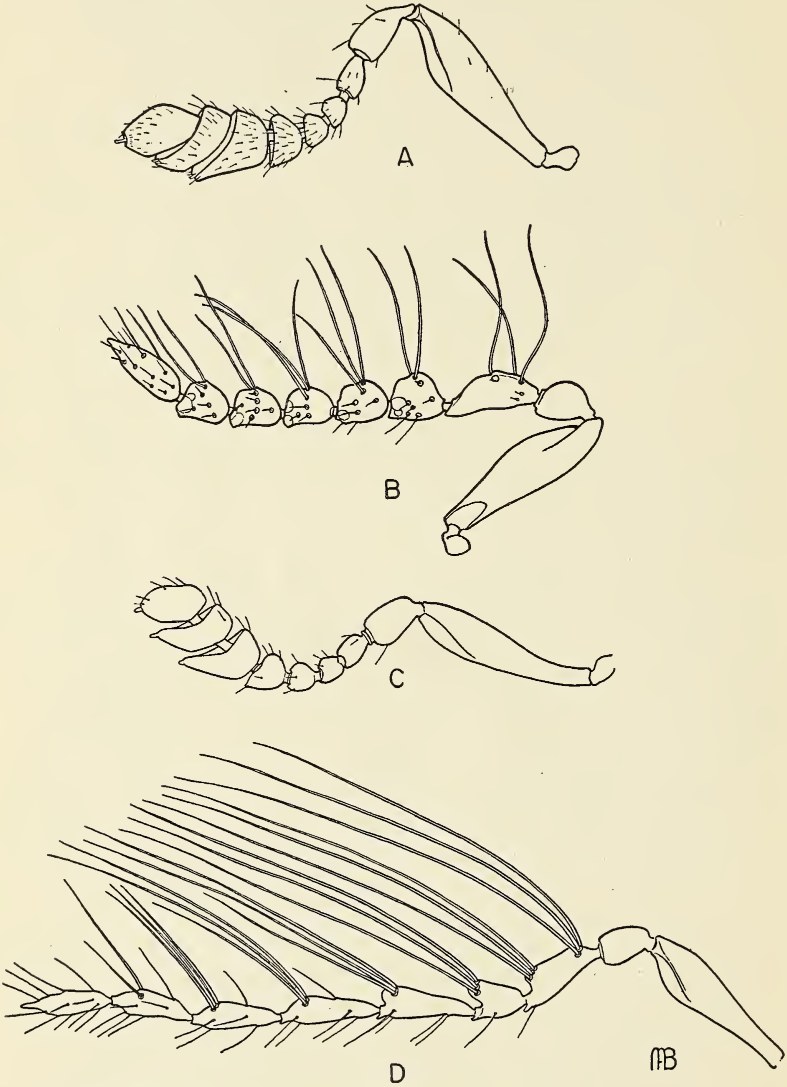
At once distinguished from *burrelli,* as well as from the two previously described Nearctic species, by its smooth, strongly convex frons, entirely yellow legs, and somewhat infumated anterior wings. Moreover, the male antenna is remarkably distinct in the form of the basal three funicular segments and the arrangement of the setae on the first.

Female.—Length about 1 mm. Head viewed from in front broadly oval; vertex weakly coriaceous and shining; occiput with minute, shallow, contiguous punctures, not carinately margined; frons conspicuously convex, smooth and shining; cheeks very weakly punctate; antenna as in Fig. 1, C.

Mesoscutum minutely, closely punctate, thickly covered with very short, appressed pubescence; scutellum flat, very faintly punctate, shining; propodeum with a prominent median longitudinal carina, and with its median length at least one-fourth its apical width; outer margin of anterior wing not ciliate.

Abdominal petiole short, largely concealed; first segment of gaster broader than long, foveolate across base, smooth on apical half; second tergite with two or three striae medially at base.

Yellowish brown to piceous; antenna yellow, club often more or less infuscated; legs entirely yellow; anterior wing slightly infumated on apical half or more, hyaline at base.



EXPLANATION OF PLATE.

Fig. 1. Antenna of A, female of *Allotropa burrelli;* B, male of *A. burrelli;* C, female of *A. convexifrons;* D, male of *A. convexifrons*.

Male.—Apart from the striking differences in the antenna (Fig. 1, D), the distinct ciliation of the outer margin of the anterior wing, and the presence of a dusky spot in the middle of the wing, the male fits the description of the female.

Type locality.—North Bergen, N. J.

Host.—*Pseudococcus comstocki* (Kuw.).

Type.—United States National Museum No. 56442.

Described from 26 females and 11 males reared by George Rau in November, 1938. I have seen several specimens of the same species which were reared by R. W. Burrell from *Pseudococcus comstocki* at Yokohama, Japan.

A Newly Imported European Lavernid (Microlepidoptera)—On 28 May, 1942, Mr. W. P. Comstock collected at light in the yard of his house in Newark, N. J., a specimen of *Chrysoclysta lineella* (Clerck). This common and widespread Palaearctic species, the range of which extends from Ireland to Asia Minor, has not hitherto been recorded from North America. Very likely it is a recent importation.

Superficially *lineella* somewhat resembles our Eastern States *Psacaphora terminella engelella* Busck but is larger (10–13 mm. as compared with 7–9 mm.). It more closely resembles some Western States *Psacaphora* such as *edithella* Busck. Actually, however, its color and pattern are quite distinctive. The forewing is bright orange; the base is black; from this a fine, silvery-metallic costal streak runs to 1/3, and a shorter streak in the disc; the dorsum is narrowly, the termen and apical third of the costa more broadly bronzy-black; there are an antemedian silvery-metallic scale-tuft above the dorsum, another below the costa at about its middle and a third beyond the tornus; there is a slivery-metallic costal dash at about 3/4.

In Forbes' key (Mem. 68, Cornell U. Agr. Exp. Sta.) to the Lavernidae, this species would run out to the genus *Blastodacna;* but it may be distinguished from this genus by the presence of scale-tufts, the absence of vein M_2 of the forewing, and the bright and metallic coloring. The absence of M_2 distinguishes it from *Psacaphora.*

The larva is a miner in the bark of *Tilia.*—Alexander B. Klots, New York, N. Y.

SOME SYNONYMY IN DERMESTES (COLEOPTERA).

By H. S. Barber, Washington, D. C.

Certain old names of beetles are continued in use through habit although prior valid and available names for the same species are listed in synonymy, in violation of the principles of the Code and to the discredit of our work and its objective. Impersonal application of evidence is a basic necessity in attempts to assemble and classify the facts in indexes to economic insects. These accumulated indexes are very extensive but they are only a beginning for a much better and more necessary service, and it behooves us to perfect our method and to reduce the element of personal preference among the great number of cooperating international contributors as to the names we use for species. For nearly half a century the International Rules of Zoological Nomenclature have helped to reduce conflicting application of names by local groups but even the law of priority has been opposed by certain workers who object to the adoption of a name, unfamiliar to them, for a species which they have known under some later synonym or misapplied name. Preference for the work of a certain early author can scarcely be accepted as reason for choice of a name, and the contributions by the great Fabricius lose little of their merit by recognition of the excellent work by DeGeer which preceded them but which was unknown to Fabricius in 1775. Even recently compiled handbooks on national or local faunae have continued the misuse of specific names as they were adopted by the disciples of Fabricius. As examples of such misuse may be mentioned *Byturus fumatus* auct. (not Linné, not Fabricius) and *B. tomentosus* auct. (not Fabricius 1775, but DeGeer 1774, although not so cited), as recently discussed elsewhere (U. S. Dept. Agr. Misc. Pub. 468).

The present note considers two destructive species of *Dermestes* which may have been dispersed by commerce from their original homes and become cosmopolitan pests long before they were recognized by taxonomy. Both species had been given valid names by DeGeer before Fabricus proposed different names for them, but the writer and others have been compelled to call them by these commonly used synonyms because the confusion of synonymy in catalogs still follows usage resulting from the great personal prestige of Fabricius, and the prior correct names would have been unintelligible to others. The long-used name of a third species is a primary homonym without an available substitute, and for this European species a new name is proposed. Although many other corrections will be required in the catalog of Dermestidae by Dalla Torre 1911 (Junk, Coleopt. Cat., pt. 33), the synonymy there given for these species should now be revised as indicated below. The usual citations being already available in the catalog, the names are here given merely by author and date.

Dermestes ater DeGeer 1774; type locality, Surinam.
- Syn. *Dermestes cadaverinus* Fabricius 1775; type locality, St. Helena.
- Syn. *Dermestes piceus* Thunberg 1781; type locality, Cape of Good Hope.
- Syn. *Dermestes felinus* Fabricius 1787 (fide Arrow 1915); type locality, Tasmania.
- Syn. *Dermestes subcostatus* Murray 1867 (fide Arrow 1915); type locality, Old Calabar.

That this species probably originated in the Orient is not evident from the records. Its cosmopolitan distribution may have become complete before taxonomic discrimination developed. The frequency of its interception in commercial shipments in recent years is in contrast to its apparent rarity in our country in earlier decades. Schoenherr 1808 (Syn. Ins., vol. 1, p. 90) suppressed the two prior names *Dermestes piceus* Thunberg 1781 and *D. ater* DeGeer 1774 as synonyms of the subsequent name *D. felinus* Fabricius 1787. This inverted synonymy has been copied by Gemminger and Harold 1868 (Cat. Coleopt., vol. 3, p. 913) and Dalla Torre 1911 (Junk, Coleopt. Cat., pt. 33, p. 43), but Arrow 1915 (Ann. Mag. Nat. Hist., ser. 8, vol. 15, p. 426) found that the types of both *felinus* Fabricius and *subcostatus* Murray belonged to the species which he knew under the name *cadaverinus*. This species should be known by its prior name, *D. ater* DeGeer, according to the evidence thus far found.

Dermestes olivieri Barber, new name—
for *D. ater* Olivier 1790 (not DeGeer 1774); type locality, Paris.

The "stillborn" homonym proposed by Olivier 1790 (Ent., vol. 2, no. 9, p. 9, pl. 2, fig. 12) has continued in use for a century and a half without an available synonym which can properly take its place. This species is therefore renamed in honor of its original describer, although unfortunately it is not identified in the material in the National Collection. Citations to fourteen publications are listed under this homonym by Dalla Torre 1911 (Junk, Coleopt. Cat., pt. 33, p. 40).

Dermestes maculatus DeGeer 1774; type locality, Surinam.
Syn. *Dermestes vulpinus* Fabricius 1781; type locality, Cape of Good Hope.
Syn. *"Dermestes elongatus* Hope," Arrow 1915 (not Linné 1761); type locality, Egypt.

This is the cosmopolitan "hide beetle," the original home of which is unknown. *Dermestes vulpinus* was listed in 1825 (Trans. Linnean Soc., London, vol. 14, p. 602) as having been found in the body of an Egyptian mummy at Thebes, and *"elongatus* Hope" is recorded from the same source. Arrow 1915 (Ann. Mag. Nat. Hist., ser. 8, vol. 15, p. 426) thought he had studied the "type" of *"D. elongatus* Hope" and that it was *D. vulpinus* F., but Hope did not describe such a species in the volume cited in the Munich and Junk catalogs. Besides being a *nomen nudum,* the name is preoccupied by Linné 1761. These records are not conclusive, and reidentifications of the old specimens or new evidence from infestations of similar ancient burials might assign these pests in early Mediterranean civilization to other species. The Fabrician name *vulpinus* has been continuously used in spite of the fact that its synonymy with *maculatus* DeGeer was recognized by Illiger 1798 (Verzeich. Kaefer Preuss., p. 314), Gyllenhal 1808 (Ins. Svec., vol. 1, p. 147), Schoenherr 1808 (Syn. Ins., vol. 1, p. 90), Gemminger and Harold 1868 (Cat. Coleopt., p. 915), and Dalla Torre 1911 (Junk, Coleopt. Cat., pt. 33, p. 50), but all these workers have adopted the Fabrician synonym and suppressed the prior name, which we should use, *Dermestes maculatus* DeGeer.

Dermestes nidum Arrow 1915
Syn. *Dermestes elongatus* LeConte 1854 (not Linné 1761); type locality, Georgia.
Syn. *Dermestes elongatus* LeConte, Barber 1914.

"Dermestes elongatus Hope," accepted as valid by Gemminger and Harold 1868, Dalla Torre 1911, and Arrow 1915, is a *nomen nudum,* there being no description or figure associated with Hope's name in Pettigrew's History of Egyptian Mummies. *D. elongatus* LeConte 1854 is, however, preoccupied by Linné 1761 for a species now placed in the ostomid genus *Nemosoma.* Arrow 1915 chose the substitute name *nidum* because this rarely-found indigenous species had just been reared by the writer from larvae infesting occupied nests of the black-crowned night heron in the same colony near Washington, D. C., which had been infested the previous year (see Barber 1914, Proc. Biol. Soc. Washington, vol. 27, p. 146).

NOTES ON THE VARIATION AND DISTRIBUTION OF MESOVELIA MULSANTI WHITE (MESOVELIIDAE, HEMIPTERA).

By Robert L. Usinger, Davis, Calif.

The family Mesoveliidae is common throughout the tropics of the old and new worlds but presents a more discontinuous distribution in temperate regions and on oceanic islands. Absence of records from the pacific slope of the United States and Canada after many years of general collecting suggested that the family followed the familiar distributional pattern of so many organisms which range northward from the tropics into the southern and eastern United States. However, in 1930, Jaczewski reported *Mesovelia mulsanti* from Saanich, British Columbia. I am now able to record the first two collections from California and to add two additional islands to its recorded distribution in Hawaii.

Specimens of *Mesovelia* were common on the surface of Swamp Lake in Yosemite National Park, California, at an elevation of 5200 feet in July 1941. Only apterous forms were seen. The lake is deep and permanent but supports numerous aquatic plants such as *Potamogeton* and pond lilies in its shallower portions. Fallen logs extend into the lake for a considerable distance and several floating islands of bog-like material are present. *Mesovelia* were found only in this lake, though a diligent search was made in the numerous shallower ponds and lakes in the vicinity.

A single macropterous male was collected on a mass of accumulated algal growth at the water's edge in Putah Creek near Davis, California, on October 6, 1941. Putah Creek rises in the Coast Range Mountains but this *Mesovelia* was collected well out in the flat Sacramento Valley.

The only native water-strider in Hawaii is *Microvelia vagans* White. *Merragata hebroides* White, although originally described from Hawaii, undoubtedly came from North America where it is very common. *Mesovelia mulsanti* is likewise American in origin, differing in many details from Oriental and Australian species. Dr. F. X. Williams first recorded *Mesovelia* from Hawaii in 1934. During the following two years I found both apterous and macropterous forms common in taro patches at Haena, Kauai, January 4, 1936; at Kahaluu, July 4, 1935, Waianae, July 7, 1935, and Ewa Coral Plain, January 12, 1936, Oahu; and at Halawa, Molokai, August 17, 1936. They were never seen except in the lowlands.

All of the above specimens pertain to the *mulsanti* complex (Jaczewski, 1930), having a pair of black tufts ventrally on the eighth abdominal segment. The male genital claspers are fairly constant for any given locality but exhibit a remarkable range of variation in the series before me from New Jersey and Ohio to California and Hawaii and from Kansas and Texas to southern Mexico. The trends in shape of claspers which prompted Jaczewski to distinguish the subspecies *bisignata* Uhler, *caraiba* Jacz. and *meridionalis* Jacz. are not evident in my material. Hence the entire series has been placed under the name *mulsanti,* even including a remarkable form from Onaga, Kansas, with hook-like claspers, though this last may eventually prove to be a distinct species.

REFERENCES.

Jaczewski, T. 1930. Notes on the American species of the genus Mesovelia Muls. Ann. Musei Zoologici Polonici, 9: 3–12, Tab. III., 25 figs.

Williams, F. X. 1934. [Records *Mesovelia mulsanti* from Oahu]. Proc. Haw. Ent. Soc., 8: 378.

Typhloglymma puteolatum Dury (Coleoptera-Cossoninae)—I was quite pleasantly surprised recently in finding that I had collected two specimens of this weevil under the bark of prostrate logs in the swamps along the Pascagoula River. The two specimens are labeled: Lucedale, Miss., Dec. 4, 1930 and April 24, 1931. The later will be deposited in the U.S.N.M. Messrs. Ralph Dury and Joseph Wright very kindly compared both specimens with the type at the Cincinnati Museum of Natural History. They report that the specimens agree with the type but that the original description is in error for the type has no scutellum and the sides of the prothorax are curved as in the Mississippi specimens. There is a further specimen in Mr. Wright's collection taken by Mr. Ralph Dury in Adams Co., Ohio—HENRY DIETRICH, Ithaca, N. Y.

A NEW CORIXID FROM MINNESOTA.

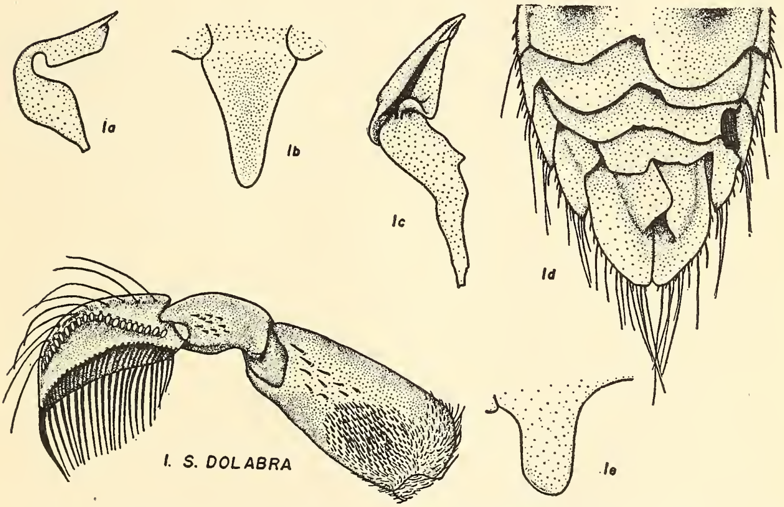
By H. B. Hungerford and R. I. Sailer,* University of Kansas, Lawrence, Kansas.

Sigara dolabra—Hungerford & Sailer

Size: Length 5.6 to 6.3 mm.; width across head 1.8 mm. to 1.98 mm.

Color: General facies dark brown. Vertex brown mottled with yellow or brownish yellow with rear margin of head dark brown. Pronotum crossed by 7 or 8 dark brown bands that are a little broader than the pale bands. The oblique dark brown bands of clavus broader than the pale interspaces and more or less furcated and connected. The pale figures of the corium broken and confused but not into longitudinal series. Membranal suture light. Membrane dark with pale figures. Venter of thorax and basal abdominal segments typically infuscated. Metaxyphus dark only at base.

Structural characteristics: Facial depression of male slight.



Text Figure 1. *Sigara dolabra* Hungerford and Sailer. 1a. right clasper. 1b. metaxyphus. 1c. left clasper. 1d. abdominal dorsum of male. 1e. lateral lobe of prothorax.

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* Contribution from Department of Entomology.

Head with median longitudinal carina on caudal half. Interocular space narrower than width of an eye. Pronotum, clavus and basal half of corium rastrate. Mesoepimeron moderately broad, the ostiolar opening to the side; Metaxyphus long. The dorsum of male abdomen as shown in figure 1d. The shape of the right clasper of the male is characteristic and suggested the name. The male pala with about 21 pegs. (See text figures.)

Location of types: Described from 11 males and 10 females bearing the label "Itasca Park, Minn., Green Lake, Aug. 21, 1922, H. B. Hungerford." Holotype. allotype and paratypes in the Francis Huntington Snow Collection, University of Kansas, and some paratypes in the University of Minnesota Collection. We also have a male labeled "Douglas Lake, Mich., Bryant's Bog, Aug. 17, 1923, H. B. Hungerford."

Comparative notes: While in color pattern and size this species resembles *S. minorella* (Hungerford) it has the lateral lobe of the prothorax tongue-shaped instead of obliquely truncate as in *S. minorella* which was taken on same date and place with this type series.

Earwigs in Colorado.—Several specimens of *Labia minor* Linn. were taken on July 27 and Aug. 26, 27, and 28, 1942, in a light trap operated on the Colorado State College Campus, Fort Collins, by Prof. Miriam A. Palmer. *Forficula auricularia* Linn., reported from Denver by List, has been received from Trinidad, Colo., Aug. 1, 1942.—MAURICE T. JAMES, Colorado State College.

Notes on Coreidae.—The following species of Coreidae in my collection seem not to have been heretofore reported from Arizona. They are: *Mozena affinis* Dallas 1852—Prescott, August 16, 1939 (Frank H. Parker, collector); *Anasa andresii* Guérin 1857—Douglas, July 4 and 14 (W. W. Jones); *Ceraleptus pacificus* Barber 1914—Rincon Mountains, elevation 3000 ft., March 4, 1928 (A. A. Nichol); *Stachyocnemus cinereus* Fracker 1918—Huachuca Mountains, elevation 5000 ft., June 14, 1928 (A. A. Nichol).

A preferred food- or host-plant of *Catorhintha selector* Stål 1859, seems to be Canyon Ragweed (*Franseria ambrosioides*), on which it may always be found.—J. R. DE LA TORRE-BUENO, Tucson, Ariz.

A NEW CERESA (MEMBRACIDAE, HOMOPTERA) FROM ARIZONA.

By W. D. Funkhouser, Lexington, Ky.

In the Spring of 1942 the writer had the opportunity of spending a month in rather intensive collecting in Arizona, particularly in the vicinity of Tucson. Through the courtesy and under the guidance of Mr. J. R. de la Torre-Bueno, a charming host and delightful companion as well as an authority on faunal areas in Arizona, it was possible to visit a number of fine collecting sites without any waste of time in searching for suitable habitats for Membracidae. One of the best of these collecting grounds proved to be Sabino Canyon, about fifteen miles east of Tucson. In this canyon was found a new species of Ceresa which is here described and figured as follows:

Ceresa curvicornis sp. nov.

Large, yellow-green, coarsely punctate, not pubescent; head triangular, clypeus not extended; pronotum highly arcuate and margined with brown; suprahumeral horns long, robust, sharp, strongly curving backward, tips brown; metopidium vertical; posterior process reaching beyond tip of abdomen and extending about one-third of the distance from the internal angles to the tips of tegmina; tegmina hyaline; undersurface of body green; femora marked with brown.

Technical description:

Head triangular, wider than high, roughly sculptured, yellow-green, coarsely punctate; base highly arcuate; eyes brown with gray vertical stripes; ocelli large, yellow edged with red, closer to each other than to the eyes and situated about on a line drawn through centers of eyes; inferior margins of genae straight; clypeus subtriangular, continuing lines of face made by inferior margins of genae, tip blunt, rounded and pilose.

Pronotum yellow-green, coarsely punctate, not pubescent; dorsum highly arcuate and margined with brown; lateral areas marked by semicircular impressions; suprahumeral horns strong, robust, about half as long as the distance between their bases, tips sharp, strongly curved backward and marked with brown; humeral angles weak and rounded; metopidium vertical, broader than high; posterior process suddenly acute, extending to a point about one-third of the distance between internal angles and tips of tegmina, tip brown.

Tegmina hyaline; base narrowly green, coriaceous and punctate; five apical and four discoidal cells; apical limbus broad and marked with brown.

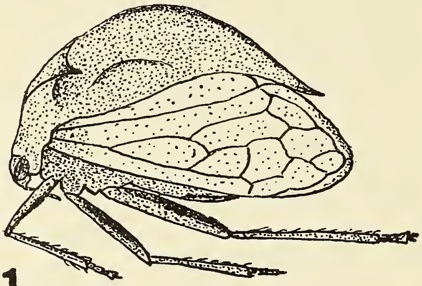
Undersurface of body green; legs simple, yellow-green; femora marked with brown; tarsi fuscous.

Length from front of head to tips of tegmina 9 mm.; width between tips of suprahumerals 7 mm.

Type: female.

Type locality: Sabino Canyon, Tucson, Arizona.

Described from a single specimen collected on grease-wood (*Sarcobatus sp.*) on April 28, 1942. Type in author's collection.



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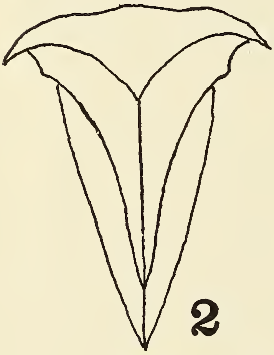

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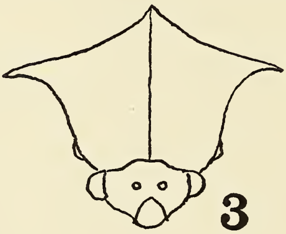

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Explanation of Figures.

Fig. 1. Lateral view.
Fig. 2. Dorsal outline.
Fig. 3. Frontal outline.

NOTE ON DISTRIBUTION OF HETEROPTERA.

By J. R. de la Torre-Bueno, Tucson, Ariz.

In a general view of the Heteroptera of the United States, one thing stands out: *all* species from northern and central Mexico should be included in our catalogues, synopses and group monographs.

All along our southern border and the Gulf of Mexico coast, and going into the Pacific and Rocky Mountain States, supposedly Mexican species are recognized here and there. Many of the species described from the United States are to be found in the northern Mexican States of Tamaulipas, Nuevo Leon, Coahuila and Chihuahua, which border on Texas; in Sonora, bordering on Arizona; and in Lower California, on California proper. Conversely, northern Mexican insects will be found in our southern border States. This is readily understood if we consider that climate and physiography are no respecters of artificial international boundary barbed-wire fences; they need no passports and are bound neither by the races on either side of the fence, nor by the political systems of tangent nations. Hence, plant systems and animal aggregations, which follow climate and soil, are equally free to pass pink or green lines on maps.

In fact, the United States are the merging place of the Boreal and of the Subtropical, or tropical, faunas and floras. Go to Arizona and Southern California and see.

This is obvious when thought about, but much overlooked in practice. As examples, consider the great Van Duzee Catalogue of the Hemiptera, and my own essay at a Synopsis of the Heteroptera, both restricted to "America North of Mexico." Moreover, much of our American monographic work has the same limitation, even though unexpressed.

An examination of any map of Mexico and the bordering southern United States shows clearly that the wooded mountains and high arid plateaus of Sonora are a part of the Rocky Mountain system, which passes north through Arizona into Utah and New Mexico. The Chihuahua part of the system passes into Texas and again north into New Mexico. Further East come the comparatively lower lands of Coahuila and Nuevo Leon, running into eastern Texas, which is also bordered to the Gulf coast by Tamaulipas. In the West, the coast of Lower California is a continuation of the line of California.

This is *not* a faunal zone essay: its purpose is merely to point out the actual impossibility of divorcing the fauna of northern Mexico from that of the bordering southern United States. Nor is it to say that subtropical or tropical insects will *necessarily* be found in our southern tier of States. But it is to say that such Mexican insects as come within the climatic and physiographic regions of Mexico which extend into the United States should be considered, sought for and anticipated in this section of our country. It is familiar to all that many Antillean insects are found in Florida; it follows that we should, and do, anticipate finding others. Similarly, we should regard northern Mexican insects as potential if not actual residents of the United States.

This is shown in a brief consideration of one of E. P. Van Duzee's papers, his article on the Hemiptera of the California Academy of Sciences expedition to the Gulf of California (Proc. Calif. Ac. Sci., ser. 4, vol. 12, no. 11, pp. 123–200, June 1923). Only a few of the better-known families are herein referred to. Of the 19 Pentatomoidea listed, 12 are recorded from the United States (Arizona, California, etc.); one is a common tropical and subtropical form; one a nymph of a United States genus; and the remaining 5 species are newly described. Any one, or all of these last may be found at some time in the warm southern end of California, or in Arizona. Twenty-four Coreoidea are listed (included in these are the Alydidae and Corizidae). Of these, 20 are known from the southwestern United States. Nymphs of *Thasus gigas* Burm. are listed clustered on mesquite (*Prosopis* sp.). If this be *Th. acutangulus* Stål, the common Arizona form on mesquite, which appears to the writer more possible, these species would number 21. The remaining 3 species are new, and from their localities might be looked for in Arizona. The 3 Neididae recorded are all common in Arizona and California. The 20 Lygaeidae listed are either recorded or known to me from Arizona. Thirteen Reduviidae are enumerated; two are new; the rest from California and Arizona.

The other families of the Heteroptera and all the Homoptera are not considered, as these are much less closely collected, and not so well known or represented in collections.

To summarize, out of 8 families with 66 recorded species in total, 7 species are new or unrecorded from north of Mexico, and 59 of the species are known from the United States; or, stated in another form, nearly 90% of the species recorded from Lower California are also found north of Mexico.

The preceding example is cited to indicate the extreme similarity of the Heteropterous fauna of northern Mexico, Sonora specifically, with that of our three bordering States; and as an exact case in point for demonstration. Other similar studies might be given for emphasis, such as H. G. Barber's Florida list.

Distant and Champion in Biologia Centrali Americana, however, worked on the fauna of middle and southern Mexico, although here occasional of their species drift far north. even if their records do not show it; as *Mamurius mopsus* Stål into Arizona (this is a first record of the species in the United States).

The pith of all that precedes is that we should be aware of the Mexican fauna in all studies of United States insects, whether they be distributional, monographic, or synoptic.

THE PIGEON-FLY, PSEUDOLYNCHIA CANARIENSIS (MACQUART), IN NEW ENGLAND AND NEW YORK (HIPPOBOSCIDAE, DIPTERA).

By J. Bequaert, Harvard Medical School, Boston, Mass.

In recent years evidence has been accumulating that the pigeon-fly, *Pseudolynchia canariensis* (Macquart), has extended its range much farther north in the eastern United States than was known thus far. It can no longer be doubted that, at least during the summer months, it occurs normally on the feral domestic pigeons which infest New York and Boston. It will no doubt be found also in most of the other large cities of the Atlantic seaboard.

The earliest definite record from New England dates from ten years ago, although it came to my attention much later. On October 27, 1932, Dr. Richard Dow found a pigeon-fly on a window pane, in a house at Cambridge. This fly could not have been introduced as an adult on a pigeon recently imported from farther south, but must have hatched in or near the place where it was captured.

From 1937 onward I have seen, from time to time, pigeon-flies taken in Boston on birds kept for experimental purposes, notably at the Department of Pathology of the Harvard Medical School and at the Boston City Hospital. In all these cases, however, the pigeons had been recently obtained from dealers or shipped in from the South, so that the flies were probably also imported as adults.

Three or four years ago a pigeon-fly was seen on a feral pigeon examined in Boston by my colleague, Dr. D. L. Augustine. During 1941 and 1942 a flock of carrier pigeons was kept in a loft of one of the University buildings in Cambridge by Dr. D. R. Griffin and

Mr. G. Bartholomew. The birds were allowed free egress at frequent intervals and feral pigeons occasionally entered the loft. Flies were seen on some of these pigeons in December, 1941, and in June, 1942, several were collected by Mr. Bartholomew and turned over to me for naming.

In New York City, two specimens of *P. canariensis* were taken in October, 1933, from a feral pigeon found in a dying condition.

Pseudolynchia canariensis[1] is not truly indigenous in the New World, being an immigrant on domestic pigeons, which were originally imported by man, although they have now become feral in many areas. I base this conclusion on the fact that this fly has never been found in America on a native host, whereas it is known from several wild species of pigeons, as well as from birds of prey, in the Old World. It is nowadays almost universally distributed in tropical and subtropical America.

In the United States the pigeon-fly is a comparatively recent importation, as it was unknown to the earlier entomologists (Harris, Fitch, Riley, Walsh, Osten Sacken, etc.). Aldrich (1905) did not list it in his Catalogue of North American Diptera and Speiser (1907) omitted it from his revised check-list of North American Pupipara. The first record in print is by Knab (1916, Insecutor Insc. Menstr., IV, p. 3), who listed specimens taken September 28, 1896 (earliest known occurrence) at Savannah, Georgia, as well as others from Ames, Iowa, and from Key West, Florida (collected in 1915). Since that time the fly has spread rapidly. I have now seen it from the following states: Massachusetts, New York, Washington (D. C.), South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, Arkansas, Iowa, and California (thus far in the southern part only: Los Angeles; San Diego). There are also published records from Maryland, Virginia, North Carolina and Kansas (F. C. Bishopp, 1929, Jl. Econ. Entom., XXII, pp. 974–980).

To Subscribers—Please do not delay return of subscription slip enclosed with your remittance—**Editor.**

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[1] I regard *P. maura* (Bigot) and *P. unicolor* (Bigot) as not separable from *P. canariensis*.

BOOK NOTES.

Insetos do Brasil, 3° tomo—**Homópteros**, by A. da Costa Lima; (Escola Nacional de Agronomía, Serie Didáctica no. 4); pp. 1–327, figs. 1–267. (Imprensa Nacional, Rio de Janeiro, 1942.)

This is the third volume of Dr. Da Costa Lima's monumental work on the insects of Brazil. As its two predecessors it reflects the greatest credit on the man who conceived and wrote it, and on the country that has published it. In our own country we have only one work comparable to this in scope and plan, the Insects of Connecticut, conceived and begun by the late Dr. W. L. Britton, and published by the State.

This third volume of "Insetos" forms chapter XXIII of the whole work. Its sections, unnumbered, cover each one of the nine superfamilies into which he divides the Homoptera, beginning with the Superfamily Membracoidea and ending with the Coccoidea, in linear order. Each superfamily ends with an extensive bibliography; and an extensive index closes the book. Of the 267 figures, a large number are original and depict Brazilian insects. These include many structural line drawings, as well as photographs of the actual insects, more or less enlarged.

The purpose of this note is double: to bring before entomologists this important and useful work; and to show the outstanding place our science of entomology fills in one of our sister Republics of the Southern Continent.

Near Horizons—The Story of an Insect Garden, by Edwin Way Teale. Pp. i–xiv + 1–319, and 160 photographs, not numbered. (1942. Dodd, Mead & Company, New York. $3.75.)

One of the evidences of advancing civilization and culture is an appreciation of the things of nature about us, from the lofty stars to the lowliest things that live. For man in his material being is a part of nature, he is in nature, and nature is a part of him.

Edwin Way Teale tells us with great charm of his own adventures and of his observations in his insect garden, on the South Shore of Long Island, within sight almost of the sophisticated city civilization symbolized by the towering skyline of New York. Aside from the scientific value of his studies on the hidden lives of shy insects, Mr. Teale has produced a literary treasure in the best tradition of Thoreau as an interpreter of nature. If the name of "Insect Homer" is already assigned, Edwin Way Teale is surely entitled to be named the "Insect Horace," for he has succeeded in welding accuracy and poetic feeling into a harmonious whole. The beauty of the text in itself is quite enough to make it a noble work of art. But for added enjoyment we have the author's marvellous photographs of a multitude of insects in the activities of their busy little lives, short though so many of them be. It is difficult to single out any one chapter, any one picture of the many, as standing higher than any of the others. Each and everyone of them is in itself a joy. To make adequate comment would call for mention of each chapter and each picture, obviously a task that would call for another book; which we could not fittingly write.

The publishers likewise are worthy of all praise for their beautiful presentation of this lovely work of art. Both the text and the pictures are expertly and beautifully done; but the reproductions of the photographs are beyond praise—every shade, every shadow, every pattern, has been given its full value.

In every way this last book of Mr. Teale's satisfies—it satisfies the aesthetic sense; it satisfies the exactitude of scientific values.

In these troublous times, it should be read as a soothing balm and a spiritual comfort.

J. R. T.–B.

EDITORIAL.

Save Our Heritage.

With this number our BULLETIN completes its thirtieth volume since we resumed publication in 1912. In this period we weathered World War I with all its trials. We begin volume XXXVIII in the heart of a far vaster war, in which our very souls are the prize we fight for. We must save our intellectual heritage if victory is not to be our loss.

Our publications are a part of this heritage, and we must maintain and preserve them as an element in the heart of culture. We can do this only through the coöperation of all of us—subscribers, authors, Society and Publication Committee. We count on everyone of these in upholding our standards and in supporting our publications, not for us, but for the heritors of our civilization and of our culture in the generations to come.

J. R. T.-B. Editor.

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